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MOTHERS, MONGOLS, AND MORES

ALASTAIR BEDDIE, M.B., Ch.B.* and HUMPHRY OSMOND, M.R.C.S., D.P.M.,†
Weyburn, Sask.

THE PROBLEM of mongolian idiocy is a poignant one; according to Penrose[2] about one child in every thousand live births is properly called a mongoloid idiot. These harmless but ineffective citizens pose many problems to the obstetrician, pædiatrician and psychiatrist, both in mental deficiency and general psychiatry; problems that are not confined to medicine, but involve economic and ethical decisions, the proper subject of the social sciences, philosophy, and religion.

Specialists in any field often fail to see that the requirements of their specialty may have to be subordinated to even more pressing general needs. Take for instance the recurring cry of euthanasia. Many eloquent pleas for voluntary euthanasia have been made from time to time; indeed a strong and humane case has been made out for involuntary euthanasia. It was only after this was subverted on a massive and brutal scale by the Nazis in Germany that it became clear that confounding moral and medical issues had paved the way to mass murder. Medical decisions are made for individual cases, but euthanasia involves a change of attitude by society as a whole and a general ethical principle. Recently the danger of making general decisions on the basis of the single case, so dear to clinicians, has come to our notice. Since the implications are wide let us consider the problem of the mongoloid idiot child.

THE MONGOLOID CHILD

There can be few doctors who have not seen the heart-breaking sight of a middle-aged mother accompanied by a doll-like mongoloid child. Many doctors advocate separation of the mother from the child as a means of reducing family stress. However, very few doctors think about the consequences of carrying out this separation, but passively accept the view of a small minority of their colleagues that separation is a good thing.

Take Rosebud for instance, who is in a corner of the baby ward. No one knows her real name. In accordance with the newest ideas, as soon as the observant obstetrician noticed that she was mongoloid he had her separated from her mother, who then left hospital without seeing her baby, and Rosebud, so named by the nurses, remains behind. She is not dead, so her mother cannot mourn her loss as would be both becoming and healthy, yet is she properly alive? Unchristened, unrecognized by her parents, she remains in a corner of the baby ward waiting for a place in the mental deficiency hospital. Why?

HOW WAS THIS DECISION MADE?

Apparently the obstetrician who delivered Rosebud decided that it would be better for her mother not to see her until he had been advised by a pædiatrician. The pædiatrician agreed that Rosebud was a mongoloid and recommended that she should go to an institution. Her mother was told gently that she could not see her child, and only kind and overworked nurses handled her from time to time.

The Spartans exposed unwanted children on hillsides; other peoples have dealt with their excess population by killing infants and old people. With a deeper wisdom than we seem to possess, they took care that there should be some means of supporting those who were forced to make such tragic decisions. If a mother, especially a newly delivered mother, must be deprived of her child for her own good or for the good of society, then society must provide some recognized way of doing this; a way that is sufficiently robust to sustain the mother in her grief and guilt, and also to sustain the nurses and doctors in the uneasiness they must feel at doing such a thing.

*Physician Superintendent, the Saskatchewan Training School, Weyburn, Saskatchewan.
†Physician Superintendent, the Saskatchewan Hospital, Weyburn, Saskatchewan.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

WHY WAS THIS DONE?

Two men, one of whom specialized in delivering babies and the other in looking after children, have made a clinical judgment which has somehow effected a social, ethical, and moral revolution. They have done it with the best intention but no thought at all of the consequences for the mother, the baby, or society. They have decided that although normal infants must be cherished and nurtured by their mothers, this infant is expendable in the interests of its mother. But what about Rosebud's mother, that shadowy lady who has disappeared from the hospital without a glance at her daughter? What has happened to her? What have her advisers done to her?

ROSEBUD'S MOTHER

To begin with, she went into hospital happily pregnant. To prepare herself for her baby she had undergone all the ceremonies and rituals which our society prescribes. Duly anæsthetised in the manner which we order, she has had her baby; but there is no baby. True, many mothers bear dead babies and get over it, but Rosebud is not dead. If she were dead there would be condolences, flowers, the priest or parson, the neighbours' sympathy—"poor little thing, perhaps she's better dead."

Death in the just born must be faced as it must in the adult or the aged. That men have striven with death through the centuries is evident in art, literature, and architecture. We have learned how to control our fear of the dead by closing our ranks as members of the living. Although each death reminds us always that we cannot escape, yet at the same time we rejoice that this time we have escaped.

We do this by mourning. In all cultures the form of mourning is prescribed. As the writer of Ecclesiastes said:

> To every thing there is a season and a time
> to every purpose under heaven,
> A time to be born, and a time to die:—
> —A time to weep, and a time to laugh,
> A time to mourn, and a time to dance.

Lindemann[1] has demonstrated that if mourning is not carried out at its proper time then it must be done at some other time. His findings suggest that many puzzling depressions are "delayed mourning." "Grief work" must, he says, accompany any loss, and if not at the time then later. In our case, the mother has in a very real sense lost her child. Let us consider the consequences of her loss.

1. PSYCHOLOGICAL CONSEQUENCES

Rosebud is lost, but she is not dead. Her mother's womb is empty, but there have been no funeral rites. Perhaps the kindly doctor said, "it is as if she'd been born dead." Rosebud is alive, however, and the question must inevitably arise, "Why won't they let me see her?" To the mother it must mean that she has given birth to something so monstrous that it were better never to see it. In fact Rosebud is no uglier than many babies which gave their mothers great joy and pleasure. Rosebud's mother knows how queer some quite normal babies look, and so she is bound to imagine something much more dreadful than a mongol child. There have always been things that must never be seen, for instance the head of Medusa, the gorgon at the horror of whose visage men were frozen to stone.

Recently a mongoloid child who had never been seen by its parents was admitted to a Mental Deficiency Hospital. Against their pædiatrician's advice and with great trepidation, they finally visited the baby. They were delighted to find that the monster they had feared was a little baby much like other little babies and with many endearing ways. When he died, a few months later, they said, "We would never have forgiven ourselves if we hadn't come to see him." They took the dead child home and buried and mourned him. All was completed in decency and decorum. A child had been born, acknowledged, named, lived a little, and died.

Failure to perform those rites of passage which we call mourning is psychologically damaging. Rosebud's mother is doubly deprived, for she has been bereft of her newborn child and has been denied the opportunity of mourning its loss. This, Lindemann observed, is a dangerous situation psychologically. Grief that cannot be openly expressed and accepted may find other expression in unaccountable depression or in psychosomatic illnesses. One might predict that among mothers who are encouraged to deny and abandon their children in this way there would be an enhanced likelihood of subsequent psychiatric illness. One of us has seen a grave depression develop in a girl following therapeutic abortion, and this began at the time when the aborted child was due to be born. It seems to us imprudent to deprive

the mother of both her child and her right to mourn its loss; to put her in a position where it is not proper for her to discuss and adjust to the loss she has undoubtedly sustained.

2. The Social Consequences

The problem of the disposal of the mongol child is more than an interference with the human rights of birth and death. Where are these abandoned babies to go and what will become of them? As there are few private hospitals to care for them, they will come to provincial hospitals for mental defectives. These tiny and often frail babies require intensive nursing and care. If they do not get it they will probably die, which is discouraging to those who run these hospitals, for it cannot be expected that nurses who handle these babies will want them to die. A mother is expected to make sacrifices which cannot be demanded of a professional nurse. Mothers work a 24-hour day, nurses an eight-hour day. Consequently if the practice of early disposal of the mongol increases, very great expense will fall upon the community; to what purpose? The object of not letting the mother see her baby appears to be to save her pain. The argument goes like this, "a mother won't feel for the baby she has never seen. If she sees the baby she will get fond of it. If she gets fond of it then the eventual parting will be more bitter." But frequently in the attempt to avoid pain even greater pain results. George Santayana once said, "Life is not a spectacle or a feast, it is a predicament." Those who try to deny this mislead not only themselves but those whom they try to help. In addition a heavy burden is assumed by the community without any evidence that it does much good.

A child's early years, whether it is a mongoloid or a genius, are formative. It is impossible to find a substitute for a mother except another mother. Early socialization is undoubtedly a process of subtle and prolonged interaction between two people, child and mother. A mongoloid child can with luck obtain a level of achievement up to that of a 7-year-old child. To do this a high degree of socialization is needed and it is very doubtful if this can be obtained anywhere but in a home with parents or foster parents.

A good case can be made for caring for certain sorts of mentally defective children in special institutions, but since the mentally defective population far outnumber the available space (between 2-3% of any population can be classified as mental defectives) a very careful selection must be exercised to ensure that those who are most in need of help and those who can make most use of help get it. Indiscriminate admission can only result in defeating its own purpose—the reduction of unhappiness.

Discussion

Human societies have developed approved ways of meeting the various predicaments which constitute life. These are mores (or customs) and laws. Nothing from birth to death is unaffected by these mores. A mother who has an idiot child has to meet this misfortune in the setting of our culture and must therefore, unless she is to alienate herself from our mores, respond to this misfortune in the way which our culture demands. To remarry too soon after being widowed causes raising of the eyebrows; to abandon an infant invokes the law. Cultures which do allow the denial of full social membership to certain newborn infants have various rituals and ceremonies for supporting those who must endure the unpleasant situation, and for expressing social approval of their act.

It is doubtful whether mothers should ever be allowed to abandon their babies at birth. If after due consultation with those whose province is mental health and illness (as well as those who specialize in infant care) this is thought to be essential, then some way must be devised to ensure that the mother is not deprived of both her child and of what is her inalienable right—her grief. If a harsh government should decree that no mother of a mongolian idiot should ever see or tend her child, its decree could be met, resisted, or evaded, but it is much harder to deal with the kindly doctor with his "all is for the best" attitude.

In the present state of our knowledge, there seems no reason why mongoloids should come to a special psychiatric hospital until they are of school age, unless some unusual need arises. When the time comes, the family doctor, the pædiatrician, and the psychiatrist in charge of the hospital for defectives must decide how best to present this unhappy event to the family, but it will at least be impossible to evade it. It does not seem to be a doctor's place to encourage his patient, on whatever pretext, to flout the mores of his society; that is, to make ethical decisions for him.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

If he believes it is desirable, he may in his role as a *citizen*—not as a doctor—attempt to alter these mores. If he is prudent he will try to determine the unintended and unexpected consequences of such changes before advocating them; and to do this he must have recourse to the social scientists for help.

SUMMARY

We have taken some of the problems arising from mongoloid idiocy to illustrate the difficulties that are liable to arise when the common medical habit of "dealing with the individual case" is applied without discrimination to what is not only a medical but also a social and moral problem. There are many similar situations arising in medical practice which can only be understood by using a much wider frame of reference than the practice of medicine itself provides. It seems to us that, as in mongoloid idiocy, the very close collaboration between medical practitioners and social scientists is needed before the issues at stake can be understood. Until the issues are understood it is nearly impossible to develop a humane, reasonable, ethical and economically feasible means of dealing with mongoloid idiocy and similar medico-social conundrums.

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RÉSUMÉ

Par le moyen de quelques problèmes résultant du mongolisme, nous avons exposé les obstacles qui surgissent quand la vieille habitude du médecin de "traiter le cas particulier" est suivie sans discernement dans les cas qui comportent un problème moral et social autant que médical. Dans la pratique, nombre de situations analogues ne peuvent être résolues par la seule science médicale. Comme pour le mongolisme, il faut une très étroite collaboration entre les médecins et les sociologues pour comprendre les résultats en jeu et prévoir les conséquences possibles de nos décisions présentes. Aussi longtemps que ces conséquences ne seront pas comprises, il est presque impossible d'adopter une méthode, à la fois humanitaire, raisonnable, morale et économique, pour résoudre le problème du mongolisme et d'autres énigmes médico-sociales.

M.R.D.

PHANTOM LIMBS*

(WITH OBSERVATIONS ON BRACHIAL PLEXUS BLOCK)

W. F. TISSINGTON TATLOW, M.D.(Lond.), M.R.C.P.(Lond.), F.R.C.P.[C.] and J. L. OULTON, B.Sc., M.D., C.M.(McGill), *Montreal*

THE ATTENTION of the authors was drawn to certain discrepancies between the literature on phantom limbs and their observations on amputees: in addition the various procedures for the relief of phantom pain appeared to differ widely. These two factors are their only excuses for adding to the literature on this subject.

THE INCIDENCE OF PHANTOM LIMBS

Weir Mitchell[21] in discussing 90 cases of limb amputation stated that only four had no delusion of the limb and that three of these latter patients were of inferior intellect. Bailey and Moersch[1] reported that 43 out of 50 amputees had phantom limbs. In a larger series of 300 prisoners of war described by Henderson and Smyth[14] only 2% denied the presence of phantoms. Cronholm,[6] too, agrees with the almost invariable presence of the phantom, and comments that out of 122 patients only four said they had never experienced a phantom and that in these the limb had been amputated under the age of five. Browder and Gallagher[4] comment that amputation after the age of four is almost invariably followed by a phantom limb intermittently throughout the remainder of life.

THE NATURAL PHANTOM

The authors feel that the "natural" phantom should be discussed before the painful phantom, because the former is regarded as an almost invariable accompaniment of amputation. It is probably dependent on a number of factors, one of them being the perception of the body image, because no phantom occurs in congenital absence of a limb; for example, Bailey and Moersch[1] described a man aged 70 with con-

*From the Departments of Neurology and Anæsthetics at Queen Mary Veterans' Hospital, Montreal General Hospital, and McGill University.

genital absence of a forearm who had never had a phantom. Head and Holmes[13] have described abolition of a phantom following a thrombosis of a cortical vessel in the parietal area.

Weir Mitchell[21] noted that awareness of a removed part was found not only in limbs but also in the nipple, glans penis and nose. He also noted that the periphery of the limbs was felt more particularly; it is well known that the limb peripheries, more particularly the index finger and thumb, have a relatively larger cortical representation. Weir Mitchell said that "in nearly all cases the most absurd mishaps remind a patient at once of his loss": and he goes on to describe patients getting up at night and attempting to walk on their missing limb or to pick up a fork with their missing hand. It is of interest that Lord Nelson regarded the presence of his phantom finger as direct proof of the existence of the soul.

The phantom starts from the very moment the patient recovers consciousness from the anæsthetic, and may be regarded in most people as a natural consequence of amputation. Most authors would not agree with Riddoch[25] that "it is usual for the patient, at least for a time, to experience sensations as if the limb was still present . . . but [these] are always more or less abnormal."

The natural phantom is described as a positive numbness or tingling, but may also be associated with sensations. The natural phantom is at first present continuously after amputation but later occurs intermittently. Henderson and Smyth[14] stated that various factors increase or reduce awareness of the phantom; for example, pain in the stump, toxæmia, infection and shock all depress it, whilst thinking about it will produce it vividly. They said that a positive tingling in the stump of the lower limb arises at the start of micturition in 90%, and a similar feeling with defæcation in 50% of cases; in some cases the tingling in the stump during micturition is very painful and therefore micturition is feared. Cronholm[6] found that in 94 cases 23 had sensations referred to the phantom with urination and defæcation, and 9 to the stump itself; it occurred most frequently when the phantom was present continuously. Swallowing very hot or cold fluids, or washing the face with cold water, will produce a phantom sensation in the upper limb. The sight of another amputee, loss of balance and various instinctive actions will recall the phantom. Henderson and Smyth[14] continue with the observation that the wearing of a wood-plaster limb makes the phantom disappear.

Cronholm[6] points out that other authors state that the phantom may be absent or present if a prosthesis is worn; in his experience, the phantom is independent of the prosthesis in the majority of cases of lower limb amputations but is often "clearer" with wearing of an artificial limb. The length of the limb is not altered but it is often shortened if already fore-shortened; usually the phantom "fits" the prosthesis. A very different effect is seen in the upper limb where the phantom is independent altogether. Cronholm[6] investigated the effects of gait on lower limb amputation; out of 64 patients, 13 had a clear illusion of walking on the phantom, 12 had a vague sensation only, 15 used a stilt gait with the phantom, and 24 used a stilt gait without a phantom at all.

The nature and the position of the natural upper limb phantom is of interest, especially in view of the fact that peripheral irritation is stated to be the greatest factor in the continuation of the phantom feeling. The phantom sensation consists most strongly in a feeling of the thumb and index finger, suggesting cortical localization. The pads of all the digits are also very clear; the elbow is felt sometimes, the forearm rarely, and the upper arm practically never. The position of the upper limb is similar to that in paralysis resulting from a cortical lesion, with adduction at the shoulder, and flexion at the elbow and the hand as if holding a ball. In the lower limb a similar hemiplegic attitude is usually found when standing, the big toe appearing more vivid than the other toes, and the heel and sole of the foot appearing more prominent than the dorsum; the ankle is weak and the knee is sometimes felt but the thigh never (Henderson and Smyth[14]).

Riddoch[25] stated that the position of the phantom is almost invariably that of the limb just before amputation, especially if the limb was painful. Henderson and Smyth[14] do not agree that this is the rule, and suggest that such an effect is dependent on psychological factors, although they agree that a long-standing fixation in a certain position before amputation (for example, in a splint) can alter the phantom position.

Associated movements in the stump are com-

mented on by Riddoch;[25] for instance, strong flexion of the sound hand against resistance would lead to abduction of the stump. Henderson and Smyth[14] have investigated the more interesting phenomena of the ability of the patient to move certain parts of the phantom itself; this ability is dependent on the strength of the phantom in consciousness. Usually the digits are the more easily moved, as one would expect from the shape and size of the phantom. The movements themselves are restricted, never occur spontaneously, and are associated with visible contractions in the stump itself; for example, in extension movements of the toes the vastus lateralis is seen to twitch even if the amputation is at the thigh. These voluntary movements tend to disappear some time before the sensory tingling in proximal amputations, but considerably later in distal amputations. Henderson and Smyth[14] stated that these movements were more easily performed in the arm than in the leg.

The relationship of the phantom to solid structures is interesting. Henderson and Smyth[14] described how the phantom limb will appear to pass through solid structures. For example, if the knee is bent whilst the patient is lying in bed the leg will appear to penetrate the mattress, and it is of interest in relation to body perception (because the amputee knows that his limb is not really there) that the phantom upper limb will appear to pass through the patient's body. In the upper limb which was fully telescoped the fingers of the upper limb phantom would appear to pass through solid structure until the stump was touched, whereupon the fingers would immediately alter position either sideways or up into the stump itself. According to Henderson and Smyth,[11] 10% of lower limb amputees show 90° spontaneous movement at the knee joint in relation to change of posture, for example, changing from a lying to a sitting position or going upstairs. This automatic movement occurs rarely at the elbow and they suggested that the movement is related to the more automatic control of the thigh muscles in relation to posture.

Telescoping of the phantom limb has been known for some years, but authors appear to differ on the effects of extraneous stimuli. Riddoch[25] has commented that telescoping may occur from the very beginning of the phantom, but that wearing a prosthesis may cause a shortened limb to regain correct distances. Weir Mitchell stated that a shortened phantom could be lengthened by stimulating the stump. Henderson and Smyth[11] in reviewing their 300 cases said that telescoping of the phantom is due to weakening of the phantom itself; over a period of two months to two years the digits gradually approach the stump. They commented that digit retention is marked, so that the limb is described as a "baby arm with hand of normal size." Henderson and Smyth[14] stated that occasionally a limb will lengthen to a strong stimulus, but that in rare instances no shortening occurs at all. Another interesting finding is that as the digits approach the stump and become attached to it they alter position and hang downwards from the stump; in 10% of cases the phantom digits actually become contained within the stump itself.

A rather different conception of telescoping is given by Cronholm,[6] who stated "that a phantom may be equivalent in length, volume, and shape to the percept of a real limb." In connection with telescoping, the work of Bors[3] is interesting; he made an investigation into the phantom limbs of paraplegic patients with complete cord lesions. He stated that a phantom was present in all patients but that no telescoping occurred; but we would comment that the paraplegic patient differs from the amputee in so far as he has visual sensations upon which to draw in relation to his phantom. The phantoms described in paraplegic patients differ also in other ways: some of the patients felt certain areas (calf and thigh muscles for instance) which are not felt by amputees, and the patients were also able to move the same muscles. Bors[3] suggested that the damaged cord might show an "artificial synapse" and that reverberating circuits might pass to cortical levels through internuncial pools. It is of interest that, when a complete cord lesion was superimposed on a previous amputation phantom with pain, the previous pain disappeared and no further telescoping occurred.

INVOLUNTARY JERKINGS OF STUMPS

Weir Mitchell[21] commented on "chorea" of stumps. He said that they were liable to jerk irregularly under volition and to contract spasmodically with emotion or weather; "even the most healthy are liable, when excited, to sudden discharge of nerve power sometimes with fibrillary spasms and in other sudden violent move-

ment in one direction." He goes on to describe a Colonel Parr who had to hold his arm as it jumped so frequently, but when his regiment was cut off at Cedar Mountain "his arm, which was never normally at rest, now lay motionless for some hours." Riddoch[25] stated that involuntary spontaneous movements were rare, but less so in painful phantoms. Bailey and Moersch[1] found that 10% of 55 cases of phantom limb were "bothered" by jerks, whilst Cronholm[6] reported that 51 out of 99 had jerkings.

Henderson and Smyth[14] related this spontaneous jumping to the increased tone in the muscles moving the stump; they noted its presence particularly in the flexor muscles during induction of anæsthesia. They postulated that the increased tone might be due either to a release phenomenon or to heightened activity in the related cortex; they thought that tone in proximal muscles might be under inhibitory control from distal ones and that increased tone might result from cutting peripheral nerves distal to the muscles. They also suggested that the jerks might be considered the motor counterpart of the sensory tingling in the phantom limb. They noted that the jerks could occur with yawning, fright, mechanical irritation of the divided nerves and rest; they concluded with the remarks that the jerks may be associated with cramp-like pains without a phantom sensation and that the jerks disappear within a few months. Cronholm[6] noted that in 25 below knee amputations the patellar reflex was increased in 22, and that it was never less than on the opposite side.

THE PAINFUL PHANTOM

Painful phantom limbs were first described by Ambroise Paré in 1551;[23] since that time the etiological factors have remained the subject of conjecture and the incidence has varied from author to author.

Pitres[24] and Leriche[17] have reported figures as high as 97% and 98% respectively of all amputees as having had phantom limb pain; the much lower figure of 5% was given by Henderson and Smyth[14] in their prisoner-of-war series.

Both peripheral and central factors have been suggested in etiology. Henderson and Smyth[14] considered that very bizarre phantom pain is possibly psychogenic in origin, and that it depends first on pre-amputation feelings such as pain from corns, tight shoes or septic fingers, and second on the actual wounding or the various experiences which followed wounding but preceded amputation. Gallinek[11] described a hallucinated psychotic patient in whom various hallucinations had been added to the phantom (he believed that God had adorned his phantom hand with ten golden rings), and commented that "the phantom limb consists of a hallucination which a person experiences after loss of an extremity." Ewalt *et al.*[8] had 2,284 amputees under observation, and commented that "all patients complaining of phantom pain have severe psychopathology" and that the phantom pain occurs in those individuals who interpret the phantom sensations as being unpleasant and painful: but we would suggest that severe pain for a period of time may surely produce "psychopathology"?

There is no doubt that in some cases cortical factors are involved in the continuation of phantom pain: Head and Holmes[13] described loss of a phantom limb from a cerebral vascular accident, and White[32] and Stone[26] produced relief by postcentral gyrectomy; Echols and Colclough[7] also reported success in treating a phantom foot by resection of the sensory cortex but noted that Horrax[16] had produced only temporary relief in a bilateral resection for painful phantom hands. Prefrontal lobotomy was suggested by Waugh *et al.*[30] as satisfactory therapy, but Watts and Freeman[28] have commented that the pain often remains as before, although the patient may be less conscious of it. Gutierrez-Mahoney[12] has described temporary relief of pain by a spontaneous convulsion.

Peripheral factors have been thought to be of extreme importance in the etiology of painful phantoms. Weir Mitchell[21] considered that peripheral irritation in the stump could cause phantom pain because he could produce phantom phenomena by electrical stimulation of the stump's nerve ending. One of the peripheral factors to be discussed first is the "neuroma." The fact that a phantom limb starts immediately after operation whilst a neuroma takes some time to form suggests that neuroma formation is not the whole story. Livingston[18] points out that the phantom exists whether neuromas can be diagnosed or not, and other authors have shown that injections of alcohol into the nerve do not cause phantom pain. Henderson and Smyth[14] believe that the only sensation arising from a neuroma is that arising from mechanical stimulation and that such sensation follows the

Canad. M. A. J.
Aug. 1, 1955, vol. 73

peripheral distribution of the nerve stimulated; they suggested that the phantom arose from the sensory motor cortex because the sensory distribution follows cortical rather than peripheral nerve distribution, because the voluntary movements correspond with a similar cortical distribution, because there was a functional correlation between sensation and willed movements and lastly because the phenomenon of telescoping suggests a cortical response.

Browder and Gallagher[4] described a patient with a painful phantom in whom a traumatic avulsion of the brachial plexus with amputation had occurred; they concluded that a peripheral factor for the phantom pain is therefore unlikely.

Riddoch[25] suggested that healing of divided nerves produced sensations which are interpreted as if the limb was still present; these sensations are projected to outline the absent part, and as the impulses diminish the phantom approaches the stump but if the sensations are painful the phantom may persist. (It is of interest that no cases of painful phantom breast or penis have been recorded.) Riddoch believed that the incoming sensations are subjected to central inhibition, but if sufficiently severe they may overcome the central inhibition so that the phantom may remain.

Herrmann and Gibbs[15] stated "we are of the opinion that the most probable primary cause is irritation of centrally conducting axones within a neuroma or at the proximal end of a freshly divided nerve," and they recommended the placing of a tight ligature about the uninjured nerve trunk one inch above the amputation.

White,[31] in discussing the etiology of painful phantom limbs, suggested that scarring leads to anoxia in nerve endings and that the pain was probably due to central effects either in cord or cortex. Livingston[20] also suggested that after injuries to peripheral nerves a marked hypersensitivity might occur possibly from central excitation whether spinal, thalamic or cortical, and possibly related to internuncial neurones. He commented "one can only speculate as to whether the trouble in the fibres is caused by compression of nerve trunks by scar tissue, by anoxæmia, by direct stimulation of afferent neurones in the walls of damaged vessels or by some unknown physico-chemical change. The nerve fibres in the stump are the ultimate exciting cause." He suggested that the sympathetic fibres formed a link in a vicious circle, because a single injection of procaine into the cervical sympathetic plexus could produce relief of phantom pain lasting for some time. Leriche[17] commented on the favourable results of sympathectomy.

Sunderland and Kelly[27] have already pointed out that in injuries to the peripheral nerves changes occur in the spinal cord, and that these are inversely proportioned to the distance of the lesions from the spinal ganglion. They considered that efferent impulses might be sent through adjoining posterior roots, giving rise to causalgic pain, with hypersensitivity spreading from an involved area.

Livingston,[20] in discussing various post-traumatic painful syndromes, pointed out that pain may even spread to the opposite limb and if the original pain disappears the secondary pain may continue. He concluded that "some dynamic process may have been initiated within the spinal cord." With regard to referred pain he said that "we are all familiar with pain from a viscus referred to the same spinal segmental area, but not so familiar with pains referred to a different segmental area." It is of interest that Cohen[5] has described pain referred to a phantom arm with angina of effort.

Livingston[20] described the hyperæsthetic areas in the stump on which pressure may produce phantom pains. Bender[2] cited causalgic syndromes accentuated by stimulation not only of the same but also of the opposite side. Cronholm[6] found that phantom sensations could be produced by pressure not only on neuroma but also on the scar, on certain trigger zones in an area around the stump, and even on the opposite limb. These sensations could be produced most frequently by deep pressure, less often by pain and least by touch; trigger zones were supplied by nerves other than those divided in the stump, and therefore impulses must have gone along non-severed nerves and elicited some change in the spinal cord producing phantom sensations. He concluded "the hypothesis of a central state of hyperexcitability with definite topical arrangements can explain why a sensation evoked by a centripetal volley in nerves other than those severed is assigned to a phantom." Cronholm[6] continued with the observation that this theory cannot explain all; for example, why the sensory phenomena may be restricted to a particular part of the phantom. He suggested that there might be some shifting in this central state

According to our observations, anti-epileptic drugs (such as Dilantin) do not appear to have any effect whatsoever on phantom pain.

The relationship to spinal anæsthesia is interesting. Moore[22] described a patient who had had his right leg amputated in 1917, and who had neuromata excised for pain in the stump up to 1935. Since that time he had had yearly attacks of pain. When a spinal anæsthetic was given a very severe pain in the stump started and continued until the effects of the anæsthetic had worn off.

Bailey and Moersch[1] have stated that, in their series of 55 painful phantoms, the average time elapsing before distressing symptoms started was five years, but they could occur up to 29 years.

Riddoch[25] thought that phantom pain had some relation to pre-existing disease, and that the more painful this disease was the more pain occurred after amputation. On the other hand Henderson and Smyth[14] stated that only a minority of patients undergoing thigh amputations for septic arthritis had severe phantom limb pain.

Treatment of the Painful Phantom Limb

White[31] has stated that the following are definitely harmful procedures: repeated resection of neuromata or interruption of trunks, reamputation, periarterial sympathectomy and section of the posterior roots. On the other hand, one resection of a neuroma, proximal sympathectomy if the limb is cold and cyanotic, anterolateral cordotomy, resection of sensory cortex or lobotomy might be successful.

Browder and Gallagher[4] maintain that the unalterable abnormal posture of the painful phantom may be affected by section of the posterior columns. Other authors—Foerster and Gagel,[10] Falconer and Lindsay[9]— have reported successful treatment by cordotomy. Bailey and Moersch[1] on the other hand stated that spinothalamic tractotomy was not a useful method of therapy and failed consistently at the Mayo Clinic.

Present Investigation

One of us (W.F.T.T.) interviewed a series of 60 amputees who were attending a limb-fitting centre or who were permanent residents at a veterans' institution; patients who had intractable pain which required neuro-surgical treatment were excluded from the series. Of the 60 amputees 53 had had a part of a lower limb amputated and 7 had had a part or whole of the upper limb amputated.

The incidence of jerking of the stump was high in the 53 lower limb amputees; only four denied ever having had any jerks and two others had not had any in recent years. In 47 amputees jerkings had continued for some time after the operation, and for over 30 years in some cases (see Table I). The involuntary movements never occurred on walking or standing, but only when sitting or, quite commonly, in bed at night; many commented that the jerks awoke them or their wives when they were just going off to sleep, but there was no connection with previous "night starts." Patients also commented that general fatigue was a definite precipitating factor, as were also stump and phantom pain. It is probable that the jerkings are caused by some release phenomenon, but it is of interest that all seven upper limb amputees denied the presence of any jerkings.

TABLE I.

LENGTH OF TIME IN YEARS DURING WHICH JERKINGS CONTINUED

Years	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*>10*	*>15*	*>20*	*>25*	*>30*
No. of cases..	–	3	2	1	1	3	1	3	4	15	1	1	1	11

Of the 53 lower limb amputees only three denied ever having had any phantom sensations; two others, who had none at the time of questioning, had had such sensations for over 20 years previously. In 48 amputees the phantom sensation had continued for some years, and in eight for periods longer than 30 years (see Table II). The patients' description of the position, shape and automatic movements corresponded with the description of other authors. Sensations of a burning, tingling nature in the phantom foot were felt with micturition in four out of 22 patients questioned; in three a similar sensation was felt with sexual intercourse, a finding which has not been commented on by other authors. One patient who had had a complete sciatic nerve lesion high up in the thigh, and who had later

TABLE II.

LENGTH OF TIME IN YEARS DURING WHICH PHANTOM SENSATION CONTINUED

Year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*>10*	*>15*	*>20*	*>25*	*>30*
No. of cases..	–	5	3	1	1	3	1	3	4	14	1	1	1	8

Canad. M. A. J.
Aug. 1, 1955, vol. 73

had a mid-thigh amputation, had a very clear phantom in spite of the previous sensory loss, a finding which has been discussed by others. Telescoping occurred in only 13 patients; in 27 there was no telescoping at all, in one the phantom limb appeared to be longer and in 12 the patients' views were indefinite; in those with double amputations any shortening appeared to be related to the length of amputation. In those patients with below knee amputations we were able to confirm the finding of an increased knee jerk on that side compared with the opposite side. The incidence of severe phantom pain was difficult to assess; five out of the total group of 60 complained of pain spontaneously but only one of these had had a cordotomy.

It is interesting that 12 of the lower limb amputees preferred to keep their prosthesis on except when in bed, and all of them volunteered such expressions as "it's second nature to me," "it's part of me" or "I don't feel complete without it." It appears that the prosthesis becomes part of the body image, and in these patients the phantom limb fits and almost becomes part of the prosthesis.

Of the seven upper limb amputees none had any jerkings, and only one denied ever having had a phantom sensation; all those with phantom sensations described the limb as shortened, and the position and movements resembled those described by others. Excessive axillary sweating was a notable feature in three out of the seven upper limb amputees, often so severe that pads had to be worn in the axilla. One patient had rather severe burning pain in the phantom, but this could be relieved by flexing the neck.

From our own observations it is apparent that with more than one amputation a phantom sensation will occur either in all or in none, and similarly pain will occur in all or in none; we found no patient with any differentiation between two limbs.

One of us (J.O.) investigated the presence of phantoms in patients who had had upper limb operations under regional anæsthesia. Fourteen consecutive patients from 25 to 50 years of age were studied. The method of regional anæsthesia employed was brachial plexus plus intercostobrachial nerve block; the operations were varied and included plastic, orthopædic and neurosurgical procedures. In all but two patients premedication consisted of a Largactil (chlorpromazine)-demerol combination, and the anæsthetic agent was 2% xylocaine with one in 100,000 epinephrine (adrenaline). Attempts were made to elicit paræsthesiæ, but they were not obtained in every case. Care was taken that the patient did not see his arm after the block and he was not questioned until the last sutures were being placed, at which time he was usually more relaxed and co-operative. The position of the phantom was determined by requesting the patient to place his normal arm in the phantom position, and he was specifically questioned about shortening, telescoping or pain in the phantom.

Early in the series, it became evident that the block must be complete before a phantom appears. Due to the progression of loss of the various senses (pain disappears before touch, motor power and position sense), an operation, such as suturing of a wound, may be performed with pain loss only. However, no phantom could appear with an incomplete block, so such patients were necessarily excluded from this report.

In our series, all 14 patients had a phantom limb (Table III) but most patients were quite unaware of it until specifically questioned. Once the sensation was aroused, however, it became very real and their answers to questions were definite. Two general types of position became apparent (Fig. 1); the commoner was the hemiplegic carrying position, with the shoulder adducted, the elbow at 90 degree flexion and the arm across the chest or upper abdomen. In the second type, the shoulder was at 90 degree abduction, the elbow flexed toward the ceiling, the wrist usually straight and the fingers slightly flexed. One patient, having placed his normal arm in the phantom position, was then permitted to see his anæsthetized arm, the position of which was quite different; a few minutes later, after having been requested to visualize his phantom again, he placed his normal arm in the original phantom position.

TABLE III.

EFFECTS OF BLOCK ON 14 PATIENTS

	Yes	*No*	*Not documented*
Paræsthesiæ (at time of block)	6	7	1
Phantom	14	0	0
Shortening (a) elbow to wrist	6	5	1
(b) shoulder to elbow	2		
Pain in phantom	0	8	6

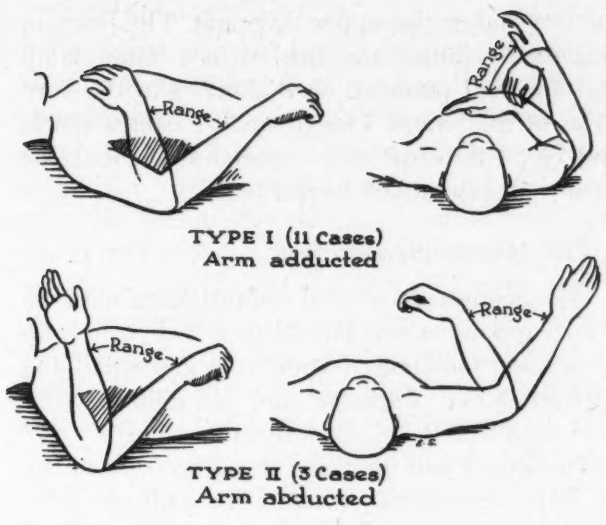

Fig. 1

At first we thought that the phantom position was that of the limb when position sense was lost, but on further observation it was noted that only two main phantom positions developed and in most cases the arm had never been in these positions. We did not inquire specifically as to the relative clearness of perception of the various parts of the limb. However, the volunteering of the sensation of shortening of the upper arm in two patients suggests that, contrary to most amputation phantoms, this part must have been felt. Shortening or telescoping was present in eight out of 13 patients questioned. Six patients stated that the shortening was in the forearm, and two stated it was in the upper arm, the amount varying from two to four inches. No information was elicited with respect either to shrinking in size of the hand or limb, or lengthening of the limb.

Paræsthesiæ were elicited at the time of the block upon insertion of the needle in 6 out of 13 instances, but no definite correlation could be found between such paræsthesiæ and phantoms, or phantom positions. None of the eight patients questioned had pain in the phantom. One case was particularly unusual. A male, 27 years of age, was undergoing an operation for a painful stump after an amputation of his right index finger in 1944. Under brachial plexus block the patient volunteered not only that he had a phantom limb, but also that all his index finger was now present. Interestingly enough, he denied ever having had a phantom finger previously.

Because of the limited number of this series, no attempt has been made to draw conclusions, but rather to tabulate and report the results so that they may serve as a guide for further investigation in the important study of phantom limb problems.

SUMMARY

1. The literature relating to phantom limbs and pain in both phantom and stump is reviewed.

2. The incidence of phantoms in limbless veterans was found to be very high, and the jerkings of the amputee's stump are briefly discussed.

3. The relationship of prosthesis to body image is commented on.

4. Observations on phantom upper limbs following brachial plexus blocks are presented. It is suggested that further study along these lines may help in understanding some of the difficulties of patients with phantom limbs following amputation.

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Canad. M. A. J.
Aug. 1, 1955, vol. 73

THE PRESENT STATUS OF INTRAMEDULLARY NAILING OF LONG BONES

P. G. COSTIGAN, B.A., M.D., *Banff, Alta.*

INTRAMEDULLARY NAILING is by no means a recently developed surgical procedure. At the turn of the twentieth century, fractures of the femur had been successfully treated by pounding steel nails down the medullary canal. The procedure was then dropped for a great number of years and reappeared again during the final stages of World War II, when we invaded Germany and discovered German soldiers who had undergone intramedullary nailings of the femur with what appeared to be excellent results, with early ambulation and a minimum of postoperative complications and discomfort.

My first attempt at intramedullary nailing was in Boston where we seemed to have an overabundant supply of transverse or short oblique fractures of the femur. Dr. Cave, chief of the fracture service of Massachussetts General Hospital, presented a series of 15 cases which he had treated, including two pathological fractures (Paget's disease) in which he had experienced considerable difficulty in passing the nail through the intramedullary canal because of the encroachment of bone on the canal, due to the osteogenic activity of the diseased bone. The results in his series were most impressive and he stated that "the adoption of the procedure of intramedullary nailing of the femur for certain types of fractures was one of the greatest advances in fracture surgery since the advent of the Smith-Petersen nail." At that time we were using the cloverleaf canalized nail, which is fairly pliable and in our hands caused a considerable number of complications. The fracture site was exposed with the patient lying on his side with the affected side up, and a lateral approach was used. The guide wire was passed up through the medullary canal, passed through the skin over the greater trochanter and then pounded on up along the flank until its interior end was flush with the inferior margin of the upper fragment of the femur. The canalized nail was then inserted over the superior end of the guide wire and pounded down the medullary canal of the femur. At the same time the guide wire was pulled out of the lower end of the upper fragment until the nail was flush with the inferior end of the upper fragment. The fracture was then reduced and held with a bone clamp and the nail pounded well down into the condyles of the femur. This procedure causes shock, and blood transfusion is essential as it should be in any surgical attack on this bone.

THE HANSEN-STREET NAIL

We encountered several complications with the above apparatus and for the past two years have been using the Hansen-Street retrograde nail and apparatus (i.e. impactor and extractor), which has simplified the procedure tremendously.

The length and diameter of nail to be used can be fairly accurately estimated by radiographing the good leg with the nail strapped to it with adhesive, along the superficial markings of femur (i.e. from trochanter to knee). We now expose the fracture site through Henry's anterior approach, which gives a good exposure of 12-16 inches (30-40 cm.) of the shaft of the femur and is relatively bloodless.

The inferior end of the upper fragment is mobilized sufficiently to allow the Hansen-Street solid nail to be placed in the medullary canal; the impactor is then attached to the lower end of the nail and it is driven up the canal and out through the greater trochanter, the skin over the trochanter is incised and the nail passes out along the flank. The last few inches of the lower end of the nail are drawn into the canal by fitting the extractor to the superior end of the nail and pounding it up along the flank until the lower end is flush with the inferior margin of the upper fragment. The fracture is then reduced and held with a bone clamp and the nail is driven well into the lower fragment. This is a very simple procedure, and if the apparatus is available, the surgeon should not hesitate to carry it out on transverse fractures of the femur, or even short oblique fractures. Dr. Aufranc of Boston has used this type of nail on certain types of subtrochanteric fractures with excellent results.

We do not use any type of external fixation, and the patient is allowed to be up on crutches as soon as he feels fit to do so. We encourage partial weight-bearing immediately. We have the patients in the pool without crutches as soon as the skin incision will warrant it. These fractures heal quickly, the patients are extremely happy in that they are able to get around, and all in all it is a most encouraging procedure to both patient and doctor.

FRACTURES OF HUMERUS

Fractures of the humerus lend themselves readily to intramedullary nailing, but there is considerable controversy as to its efficacy. Dr. Ingersoll of Boston is a great advocate of this procedure, and in a recent lecture presented six cases in which the results certainly were impressive. The nail is threaded into the medullary canal by chiselling a window out of the cortex at the lower end of the humerus; the nail is then passed up to the fracture site and the fracture reduced and the nail pounded on up towards the head of the humerus. Technically it is a simple procedure. Distraction of fragments is the common complication, but many claim that if a nail of proper diameter is used and the fragments are well impacted this does not occur. I have seen one case of non-union which required plating and grafting following this procedure, but non-union of the shaft of the humerus is a common sequela of plating too. I believe that a more effective method for treating fractures of humerus will be developed in the near future and will probably be a combination of intramedullary fixation and screws or wires.

FOREARM BONES

Fractures of both bones of the forearm in adults present a real problem with respect to reducing them by a closed method and maintaining reduction in a full-length plaster cast. In young people up to the age of 10 or even 12 years, it should never be necessary to perform an open reduction; these fractures can all be reduced by manipulation and held in a plaster cast. In a series of over 100 of these fractures handled by eight different doctors, of which I happened to be one, only one open reduction was carried out and this one was not necessary. It is a simple matter to manipulate these bones into a fair approximation. Adults present a different problem. We have found that our best results are obtained by using an intramedullary Kirschner wire in the ulna, with a plate on the radius plus a small cortical graft placed on the fracture line and taken from the shaft of the radius. Some surgeons favour the use of intramedullary nails in both radius and ulna. This is purely a matter of choice. The ulna lends itself readily to intramedullary nailing. We usually plate the radius first. In order to use an intramedullary nail or wire on the radius, the fracture site is exposed and the incision is carried down to the dorsal radial tubercle of Lister or a separate incision is made over this tubercle; a 3/32-inch (0.24 cm.) Kirschner wire is then passed through the cortex just medial to the tubercle and, by use of the drill, is drilled through the medullary canal up to the fracture site. The fracture is then reduced and held and the Kirschner wire is driven well into the upper fragment, radiographs being used to obtain the proper position.

Since the ulna lies in a subcutaneous position throughout its entire course, it is a simple matter to expose its shaft. The incision is made over the fracture site and the lower end of the upper fragment is mobilized sufficiently to allow the 3/32-inch Kirschner wire to be inserted into the medullary canal. The wire is then drilled into the medullary canal, passes out to a subcutaneous position by going through the olecranon, and is then extracted by pulling on the superior end of the wire until the inferior end of the wire is flush with the inferior end of the upper fragment. The fracture is then reduced and the wire is drilled well into the lower fragment. This is an extremely simple procedure and will give any surgeon a great deal of satisfaction. I usually cut the wire off just below the skin over the olecranon and either bend it down and close the skin over it, or close as much of the skin as possible and leave the wire sticking out so that it is easily removed.

Postoperative care should be left to the surgeon. If good solid fixation can be demonstrated, plaster casts are not necessary.

METATARSALS AND METACARPALS

Intramedullary fixation of transverse fractures of the metatarsals with marked displacement of fragments is an excellent procedure and the results are most gratifying. I have had two cases in the last year with multiple transverse fractures of metatarsals, and also dislocation of the metatarsals from the cuneiform bones. An incision made over the midline of the dorsum of the foot gives excellent exposure of metatarsal and tarsal bones. I use the short Kirschner wires, 3/32-inch, which are sharpened at both ends. The wire is placed in the medullary canal of the superior end of the lower fragment of the metatarsal and is drilled down the canal to the head of the metatarsal. The toes are then hyper-

extended and the wire passes through the head and out through the skin of the sole of the foot. The fracture is then reduced and the wire is driven up into the canal of the upper fragment by attaching the drill to the portion of wire protruding from the skin of the sole of the foot. If the metatarsal has been dislocated from the cuneiform bones, the dislocation is reduced and the wire is drilled into the corresponding cuneiform and will maintain the fracture dislocation in anatomical alignment. A short, non-weight-bearing cast is then applied.

Transverse fractures of the metacarpals and first phalanges lend themselves readily to intramedullary fixation. In fractures of the first phalanx of any of the fingers, the finger is flexed at the metacarpo-phalangeal joint, a nick is made in the skin over the base of the first phalanx, a 3/32-inch Kirschner wire is then drilled into the medullary canal of the first phalanx, the fracture is reduced and held between the fingers, i.e. by closed reduction, and the wire is passed into the medullary canal of the distal fragment. The wire protruding from the skin is then cut off, leaving just sufficient so that it can be gripped with a hæmostat and pulled out when healing is complete.

Transverse fractures of the metacarpals are readily treated by using an intramedullary Kirschner wire; a nick is made in the skin over the head of the fractured metacarpal, and a 3/32-inch Kirschner wire is drilled into the medullary cavity of the lower fragment of the metacarpal with the fingers in a flexed position. The fracture is then reduced and held between the fingers, i.e. closed reduction, and the nail is drilled on into the medullary cavity of the distal fragment. The results of using intramedullary nails in fractures of the first phalanges and metacarpals are really excellent and do away with painful skeletal traction or other forms of painful traction apparatus.

TIBIA AND FIBULA

Transverse fractures of the tibia and fibula are extremely common, occurring for the most part in the middle third, but also often seen in the upper or lower third. Since the recent revival of intramedullary nailings of long bones, there has been a great deal of controversy and a great deal of criticism concerning the efficacy of this procedure in fractures of the tibia.

In the *Journal of Bone and Joint Surgery*, of January 1952, Frederick von Saal published an interesting series of cases in which he had used intramedullary "nested pins." His results were very encouraging. Recently I talked with an orthopædic surgeon now practising in Calgary who had treated a series of 12 during his residency in surgery and he was really impressed with the results and also with the convalescence.

During the past year, in dealing with over 35 unstable fractures of the tibia and fibula, which required open reduction and internal fixation before adequate alignment and stabilization could be obtained and maintained, we have used only one plate and this was in a badly comminuted fracture of the tibia that could not be stabilized with any other method of internal fixation. We feel that most cases of delayed or non-union of the tibia are due to the fact that the bone ends are plated and held apart and we thus prefer to use only screws or, in a transverse fracture, intramedullary fixation.

The procedure of inserting an intramedullary nail into the canal of the tibia requires much less surgical dexterity than the use of either a plate or even screws. The fracture site is exposed and the bone ends are approximated and held by a bone clamp. We then extend the incision to just below the tibial tuberosity. A separate incision at the superior end of the tibia just below the tibial tuberosity may be used. A window is then removed from the anterior cortex of the tibia and the proper length — usually 13-14 inches (32.5-35 cm.) with a diameter of 8 mm. — is threaded into the canal. The pins are then driven well down into the canal of the lower fragment, or until the superior end of the pins used are flush with the anterior cortex of the tibia at the point where the window has been raised. Postoperatively we do not use a cast and we encourage partial weight-bearing as soon as possible in order to impact the fragments on the pins. The Egger slotted plate was supposed to allow impaction of fragments with weight-bearing. In theory this was excellent, but, as many of us who have used this plate know, it just did not work. We have really been impressed with the results of intramedullary nailing in transverse fractures of the tibia and fibula. It has many advantages and should certainly be listed in the armamentarium of any surgeon dealing with fractures in this area.

CONCLUSIONS:

1. Intramedullary fixation of certain types of fractures of long bones is a simple and excellent method of treatment.

2. We are fairly well convinced by now that intermittent axial pressure exerted on fractures of long bones promotes healing and callus formation. Intramedullary nails properly placed will allow weight-bearing and therefore provide intermittent axial pressure.

3. Joint movements can be allowed with properly placed nails, and therefore there is no prolonged period of joint stiffness following removal of casts.

HEREDITARY ANGIONEUROTIC ŒDEMA IN TWO FAMILIES*

W. B. SPAULDING, M.D., F.R.C.P.[C.],†
Toronto, Ont.

THIS RARE DISORDER is manifested by recurring, sudden, brief attacks of œdema, usually involving the body surface and linings of the mouth, throat and gastrointestinal tract. Affected persons have bouts of visible swellings and abdominal pains: some have only visible swellings; others only pain; some have both occurring at the same time, while others have both but not simultaneously. The diagnostic difficulties experienced in our hospital, and reported by other doctors who have seen such patients, indicate that the disease is not well known. This lack of familiarity is due to the rarity of the condition, the transience of the attacks, the usually favourable outcome of individual episodes, and failure to enquire into the family history. It is important to know of the disease because, unless the nature of the episodes of abdominal pain is recognized, there may be unnecessary surgical treatment, and unless attacks of severe laryngeal œdema are treated by prompt tracheotomy the patient may die.

In 1888 Osler,[1] at that time Professor of Medicine in Philadelphia, wrote the first full description of hereditary angioneurotic œdema. He reported five generations in a family of which certain members had swellings of the face, throat, limbs, buttocks and genitals, often accompanied by colic, nausea, vomiting and sometimes diarrhœa. At least one and perhaps two died of laryngeal œdema. He mentioned that hereditary angioneurotic œdema had been reported previously in three other families. Ensor,[2] in 1909, contributed a large pedigree to the *Treasury of Human Inheritance* collection, consisting of 141 members in seven generations of an English family; 49 were affected, 12 dying of laryngeal œdema. J. R. and T. R. Crowder[3] wrote an excellent account of five generations of an Indiana family with 64 members, 28 affected and 15 dying as a result of the disease. Some of the more recent publications are listed in the bibliography.[4-9]

The following case history describes in detail the attacks of colic and superficial swelling which occurred in one member of a family with this disease. The history will be presented under several headings: the attacks of abdominal pain; the "swellings"; the family history; and the therapeutic trials in this case.

CASE 1

F.K., aged 27, comes from a large Ukrainian family, most of whom live in Saskatchewan. He has been healthy and energetic except for curious attacks, either "swellings" or abdominal pain, which began at seven years of age. Each upset lasts a few hours or days, then disappears completely until the next episode a few weeks or months later.

The attacks of abdominal pain follow a fairly definite pattern. Often there are no apparent exciting factors. At other times emotional upsets provoking anxiety or a state of pleasurable excitement may precede the attacks. One attack began less than an hour after a violent argument in which the patient threatened to hit a fellow employee. Another came several hours after an unsuccessful attempt to dissuade a fellow boarder from dropping cigar butts in the front hall which the patient's wife had been trying to keep clean. At least ten times the patient has had much the same dream: he is alone, struggling through a wet, muddy, marshy region, sometimes wading in, other times swimming through and occasionally skimming over the wet place striving to reach some undefined goal. Invariably an attack follows such a dream within the next two or three days. The more he struggles in the dream, the more severe will be the subsequent pain and vomiting. His father (who was once admitted to hospital because of facial œdema) has had similar dreams with the same sequel. In addition the father suffers attacks of abdominal pain after he dreams about women. Various foods are believed to act as excitants, including choke cherries, apples, fresh bread, macaroni and spaghetti. Alcohol taken in more than small amounts will bring on an

*From the Department of Medicine, University of Toronto, and the Medical Service, Toronto General Hospital.
†John and Mary R. Markle Scholar in Medical Science.

attack. Affected members of this family have learned from bitter experience to be very temperate in their drinking.

For several hours up to one day before the pain begins there may be prodromal symptoms of malaise, anorexia, nausea, what the patient describes as a "foamy taste" made worse by drinking anything, vague abdominal "growling" with bowel sounds audible to the patient, and the frequent passage of pale urine which may burn as it is voided.

In the attack itself the pain is a generalized, dull, steady abdominal distress overlaid by severe colic which may be epigastric, periumbilical or lower abdominal. Usually the waves of pain ascend from the lower or mid-abdomen to the upper abdomen. The cramps, which last fifteen to thirty seconds, follow one another every three or four minutes. With the colic the patient repeatedly vomits heavily bile-stained fluid; vomiting partially relieves the pain. With each paroxysm his abdominal wall tightens up and when the pain becomes intense he doubles over and writhes about. Often, when the pain is maximal, his breathing deepens and quickens involuntarily; the fingers, toes, and then the hands and feet tingle and feel numb; occasionally the forearm and calf muscles go into spasm. During one particular attack first one hand and then the other assumed the characteristic posture of tetany, but only for about fifteen seconds at a time; Chvostek and Trousseau signs were negative. At such times respiration varies, apnœic pauses following deep, forceful breathing. The vomiting, which does not precede but follows the paræsthesiæ, appears to relieve these symptoms. After cessation of the limb cramps he feels cold, shivers and cannot keep his teeth from chattering. The coldness is a reliable sign that the attack has reached its height and will soon be over.

Other symptoms which may accompany the pain include: blurring of vision at the height of the colic, clearing as the pain subsides; excessive sweating; a pounding bifrontal headache which may last all day. There may be no urine output for as long as twelve hours and if a little is passed it has the colour of strong tea.

Examination during an attack shows a pale, anxious young man who groans and writhes with pain. The blood pressure is lower than usual. The abdomen, though diffusely tender, is not rigid. There is no fever, but late in a severe bout he becomes dehydrated with a rise in the white and red cell counts, hæmoglobin and hæmatocrit readings, as well as the appearance of urobilin in the urine. During one attack left ptosis, usually present to a slight degree, was more marked and was accompanied by weakness of the left lateral rectus muscle.

Certain *sequelæ* occur on the day after the pain. He feels much better, is thirsty and has a good appetite, drinks copiously, passes more urine than usual and has one or more watery bowel movements. Rarely, the usual warning symptoms instead of being followed by severe pain pass directly into the symptoms described under sequelæ.

This description of a single attack of pain observed in hospital in November 1950 is representative. He was awakened in the morning by severe, crampy, lower abdominal pain which doubled him up. After a few hours he vomited, doing so four times during the day. He passed no urine for eight hours before admission to the Toronto General Hospital that evening. On admission the patient looked acutely ill, his blood pressure being 80/50, hæmoglobin value 140% and white cell count 42,000. The abdomen was diffusely tender but not rigid. (One can readily understand why two laparotomies had been done in previous attacks.) He could not void and catheterization yielded only 5 c.c. of urine. Because of the strong family history of abdominal pain, urinary porphyrins were sought but none could be demonstrated on repeated tests. He described the occurrence of "swellings" in himself and relatives but, at that time, none of the staff (including myself) related the abdominal pain to the "swellings." He recovered quickly after 24 hours, the only treatment being by analgesics and intravenous administration of fluids. The white cell count and hæmoglobin value fell to normal while the blood pressure rose to 100/70.

The "swellings" also have well-defined characteristics. They appear only after minor injuries, as the following examples demonstrate. He jumped from a bus doorstep on to the curb, landing on his right foot, and about twelve hours later the right foot was diffusely swollen (Fig. 1). After using his right foot to spade the garden,

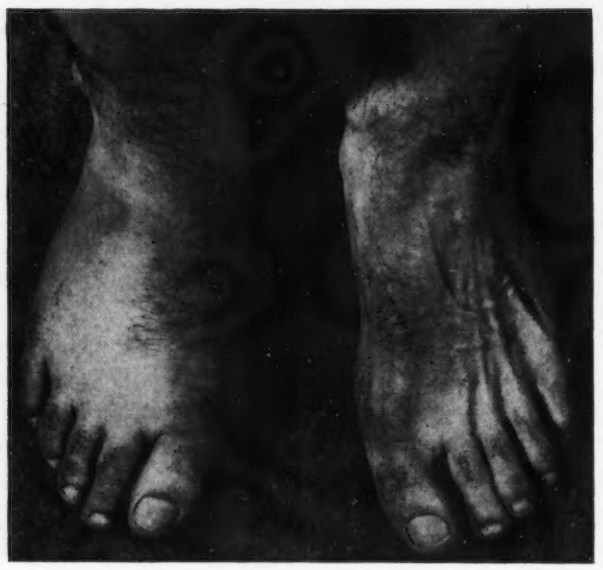

Fig. 1.—Œdema of the right foot.

the foot swelled up. Twice his lower face and pharynx became œdematous following the extraction of lower teeth. The day after a strenuous evening of bowling his scrotum enlarged to the size of a grapefruit, the right groin and penis also swelling.

The *location* is of interest because trauma to the upper or posterior aspect of the head, any part of the thorax, abdomen (except genitals) or legs has never brought on an attack whereas the lower face and arms are particularly vulnerable, severe swellings in these parts sometimes spreading to the larynx. Three times respiratory obstruction has necessitated hospital admission. The genitals have reacted only twice, and the feet three times. When such resistant sites do swell there is little spread; for example, œdema of a foot never extends above the ankle.

The response to trauma varies. Sometimes a slight blow causes severe swelling while at other times a heavy blow to the same part fails to induce any response. In general, the more intense the trauma the more severe the swelling. Repeated minor injuries to, or much exercise of a part appears to protect against œdema. For example, the patient used to work in a lumber yard lifting and tossing boards all day but, despite frequent minor injuries, he had no swellings. A few years ago he enjoyed gymnastics, doing horse and parallel-bar work without mishap until one day, misjudging a leap, he landed on his face instead of his hands. The face soon swelled markedly. When more resistant and less common sites like the feet react, a long latent period of up to twelve hours separates the injury from the onset of œdema. After injury, exercise of the affected part usually prevents prolonged and extensive tissue swelling.

The *spreading of the œdema* lasts from a few hours to a few days. The affected part of the

body swells diffusely without changing colour or temperature. Before reaching its maximal extent the œdema pits slightly on pressure, or not at all, but as it subsides the swelling pits easily. Mechanical obstruction can stop the spread of the œdema temporarily; for example, if the hand and wrist are swelling, wrapping a bandage tightly around the forearm will stop the ascent of the œdema. The distal part becomes bigger and bigger until the pain is so great that the bandage must be removed. After this the œdema proceeds up the arm.

His most severe episode of swelling began on November 24, 1952, when he fell at work, striking his right elbow on the cement floor. About two hours later the elbow and upper arm began to swell. He felt ill and vomited that day but had no pain. After two days the swelling had progressed slowly to involve the shoulder and right side of the neck. That evening he was moderately dyspnœic and had a dull pain in the right chest, aggravated by breathing. During the night breathing became more and more difficult until, at five o'clock on the morning of November 27, he arrived at the Toronto General Hospital suffering from severe dyspnœa and dysphagia. Two hypodermic injections of 0.5 c.c. of 1:1,000 adrenaline, half an hour apart, failed to arrest the swelling. By 9.00 a.m. he was worse: the uvula and pharyngeal walls were grossly œdematous. At this time 20 mgm. of ACTH in 1,000 c.c. of 5% glucose solution was given intravenously until 1.30 p.m. when he was so

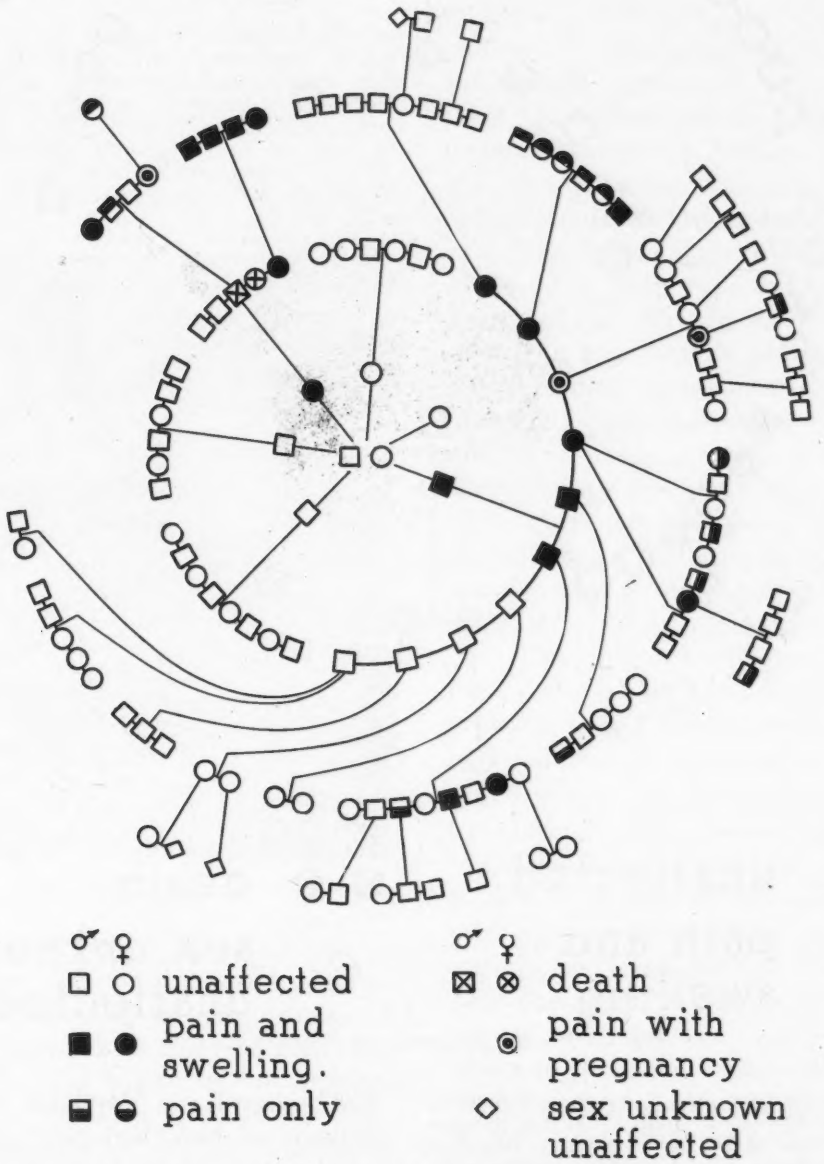

Fig. 2. (Case 1).—Direct line of inheritance through five generations.

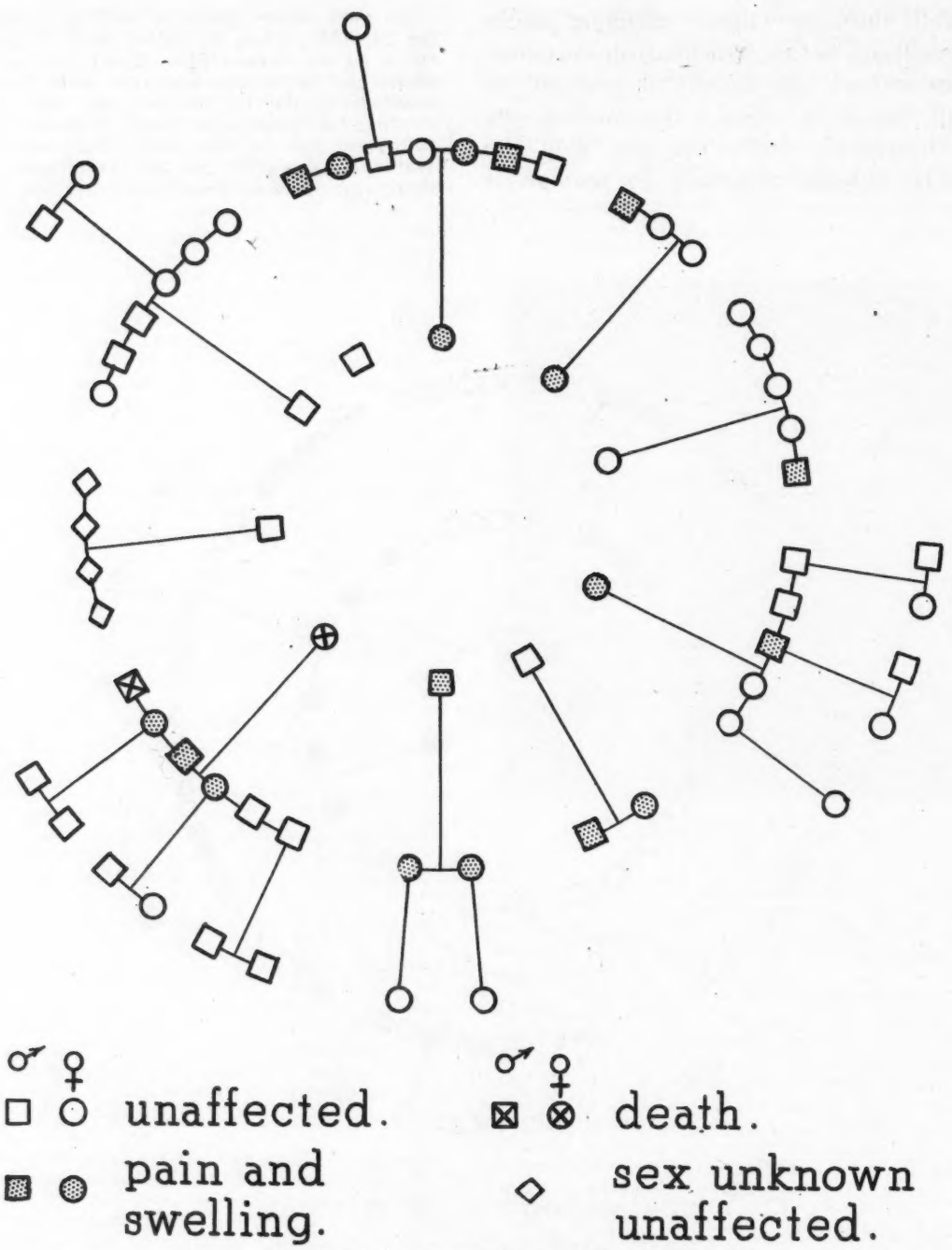

Fig. 3. (Case 2).—Record of 66 members of family.

dyspnœic that a tracheotomy had to be done. Following the tracheotomy, he recovered rapidly. (On this occasion he was under the care of Dr. A. H. Squires, who had previously made the diagnosis of hereditary angioneurotic œdema.)

Family history.—The patient's mother, who has a remarkable knowledge of her family, gave information about 138 relatives. Fig. 2 shows the direct line of inheritance traced through five generations, four containing affected members. Of the 138 (59 females, 76 males and three children of unknown sex), 36 (18 females, 18 males) are known to have been affected; 17 have had both pain and "swellings" (nine females, eight males); 14 have had pain only (five females, nine males); three have had pain only while pregnant. A female and a male died of "choking," the latter soon after a tracheotomy done too late.

Therapeutic trials.—No drug has prevented or stopped attacks. While taking pyribenzamine, 50 mgm. three times a day orally, the patient had the attack of severe laryngeal œdema already described. Oral cortisone (50 mgm. initially, followed by 25 mgm. every four hours), beginning at the onset of an attack, has failed to prevent

the progression of abdominal pains or swellings. Hypodermic adrenaline and intravenous ACTH did not arrest the attack for which an emergency tracheotomy was required.

The second case history, which concerns one member of another family, is presented briefly because the attacks of colic and visible œdema resembled those described in Case 1.

CASE 2

Mrs. E.R. began having attacks of abdominal pain at seven years of age, and swellings four years later. At the age of 53, during an attack of abdominal pain and vomiting, she had some 50 cm. of grossly œdematous jejunum resected. A few months later her larynx and tongue suddenly swelled; the latter can be seen in Fig. 4. The œdema subsided after hypodermic injection of adrenaline. In her sixtieth year she died of aplastic anæmia.

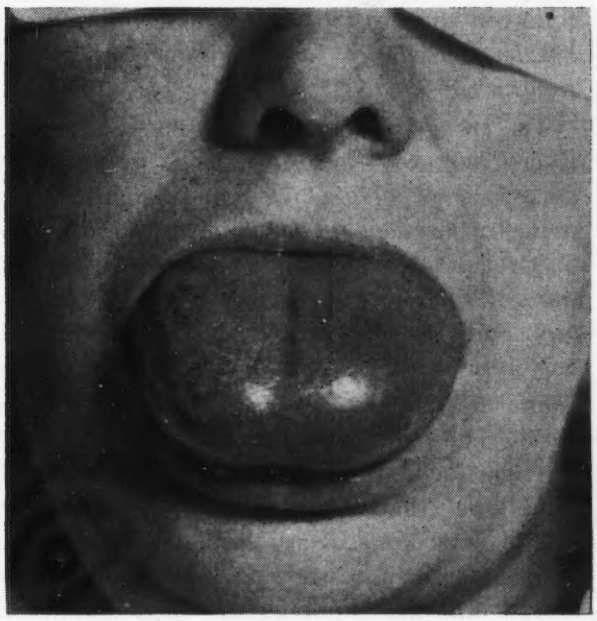

Fig. 4.—Œdema of the tongue.

The *family history* of 66 blood relations is recorded in Fig. 4: 33 females, 29 males and four whose sex is unknown. Of the 20 members affected, 11 have been female and nine male. One male and one female have died of laryngeal œdema.

The two families (Figs. 2 and 3) resemble each other in that the first has had 26% affected, males and females in equal number, and a mortality rate in affected members of 5.5%, whereas the second family has had 30% affected, a nearly equal division of males and females, and a mortality rate of 10% from the disease.

DISCUSSION

Of the various theories about the etiology of this disease which have been proposed, only a few seem worth considering: that the disease is a neurosis; that it is a condition of hypersensitivity to a foreign protein; that it is a genetic abnormality. From a descriptive viewpoint the essence of the disease is an inherited tendency to suffer localized œdema. States of heightened emotion which have no special effect on ordinary people may bring on attacks (as happens commonly in other vasomotor disorders, such as migraine). However, the clear-cut hereditary pattern is strongly against the hypothesis that the disease is primarily psychogenic. Furthermore, in neither family reported herein was mental instability a feature. The first patient, F.K., in spite of numerous attacks and knowledge of fatalities in his family, has borne the handicap well. His nervous reaction has been milder than might have been expected. It has often been suggested that affected persons inherit a hypersensitivity to a foreign protein contained in an article of diet; perhaps the affected members of each family are sensitive to a specific substance such as a common article of food. Against this supposition is the fact that in no recorded case has a particular allergen or group of allergens played a major part, despite the fact that a determined search is often made; in one case a synthetic diet failed to prevent an attack of swelling.[9] This disease resembles an inherited metabolic disorder like hereditary porphyria, and it is probable that a genetic biochemical defect will eventually be demonstrated.

Commonly, no *precipitating cause* can be found for an attack of swelling or of pain. Trauma frequently brings on surface œdema and, in this regard, operations in the mouth such as teeth extractions or tonsillectomy are particularly serious because severe laryngeal œdema may follow. Fear and anger make some patients more prone to attacks[10] (see Case 1—F.K.). A few patients attribute their abdominal attacks to overeating and drinking on an empty stomach[10] or to eating certain foods including tomatoes, strawberries and lemonade.

Pathoogical reports on patients dying of laryngeal œdema emphasize the striking degree of swelling seen and the widespread involvement of mucosa, submucosa and underlying muscle observed on microscopic examination.[4, 9, 11, 12] In one case the alveoli and interstitial tissue of the lungs were œdematous,[4] and in another case the alveoli were filled with albuminous material.[9] During a test meal carried out shortly before an

Canad. M. A. J.
Aug. 1, 1955, vol. 73

abdominal attack, extremely œdematous gastric mucosa was aspirated; the lymphatics and blood vessels appeared enormously dilated under the microscope.[13] These cases had no eosinophilia or other striking cellular reaction.

Observations at operations done for attacks of abdominal pain have been variable. In one case the peritoneal cavity was full of a pinkish fluid which coagulated instantly on cooling.[8] F.K. (Case 1) had two laparotomies, the second showing only a few adhesions. One of his sisters operated on during an attack was found to have considerable fluid in the abdomen as well as enlarged, œdematous lymph nodes in the mesentery of the small bowel. Mrs. E.R. (Case 2) had an œdematous segment of small bowel removed during an attack of colic.

The two families reported in this paper show the usual *pattern of inheritance* which, as discussed by Cockayne,[6] is that of a dominant gene. Such a pattern when fully developed shows half of those members in the affected branches of the family to suffer from the disease. It is probable that a number of the children in the two pedigrees (Figs. 2 and 3) will develop symptoms in the future, thereby bringing the proportion of members involved nearer to one-half. Furthermore, some patients have only rare, mild attacks which could easily be overlooked, especially as many details of a family tree must be obtained at second or third hand. Inheritance is usually direct via an affected member. Earlier reports[6] indicated a preponderance of males affected, but the two families described fail to show such a tendency.

Usually *attacks begin in late childhood* but they have been reported during infancy[2] and occasionally none appear until adult life. As a rule attacks become less frequent and milder in middle life or old age, sometimes ceasing completely.

There are undoubtedly *differences in the tendency of various parts of the body to swell* in this disease. Externally, the hands, feet, face, throat and genitals are most susceptible whereas the trunk is seldom affected. Internally, the gastrointestinal tract commonly swells but other viscera seldom do so. In one 18-year-old girl the uterus swelled to form a hard, painful mass the size of a "twenty-pound cannon ball."[3] F.K. (Case 1) on rare occasions has had severe burning on micturition, felt above the pubis and in the penis, accompanying swellings or abdominal upsets. Another patient had severe pain in the penis at the onset of an abdominal attack.[13]

The occurrence of attacks of *abdominal pain during pregnancy* but at no other time (see Fig. 2) would appear to be unusual, for no reference to it has been found. Ricochon is quoted[2] as having observed that during abdominal crises members of the family he described felt very thirsty and fell asleep readily. These same complaints were made by F.K. (Case 1), who would sleep between paroxysms of pain and feel a great urge to drink even though he immediately vomited the liquid.

An *exanthem* may precede surface swellings. Mrs. E.R. (Case 2) noticed red rings, never itchy and slightly if at all raised, which were followed the next day by swelling of the part. Similar occurrences are mentioned in previous reports.[1, 10]

The *prognosis* varies in different families. Every member of one small family, eight persons, was affected in four generations, two dying of laryngeal œdema.[8] The mortality rate may reach more than 50% of those affected;[3] on the other hand, if the families of Cases 1 and 2 are combined one finds that there have been only four deaths in 56 cases, or 7%.

For the *treatment* of abdominal attacks, analgesics such as demerol help to relieve the pain, and when vomiting leads to dehydration, fluids should be administered intravenously. Surgical treatment is unnecessary because the intestinal œdema subsides in a few days. No effective drug therapy for the swellings has been found. One has the impression that adrenaline perhaps helps if given soon after the onset of a bout of swelling, but adrenaline may fail to arrest established laryngeal œdema when desperate need exists for a life-saving measure. Under such circumstances tracheotomy must be done promptly to relieve the obstruction. It may even be necessary to consider leaving severely afflicted patients with a permanent tracheotomy.

SUMMARY

The clinical features of hereditary angioneurotic œdema, as found in members of two Canadian families, have been described and amplified by data from earlier writings. The essence is a family history of recurring attacks of spreading œdema affecting the surface of the body and certain viscera. The attacks, which

last a few hours to a few days, may cause severe intestinal colic and may produce fatal laryngeal œdema. Drugs, including antihistamines, ACTH and cortisone, have neither prevented nor controlled attacks. Tracheotomy has sometimes been life-saving where laryngeal œdema prevented adequate respiration.

Drs. E. J. Maltby and Trevor Owen kindly provided the clinical record of Case 2. The Department of Art as Applied to Medicine, University of Toronto, produced the diagrams of the family trees.

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THE USE OF RESERPINE IN AN OPEN PSYCHIATRIC SETTING*

G. J. SARWER-FONER, M.D. and W. OGLE, M.D., *Montreal*

THIS PAPER is a report of our preliminary observations on 37 carefully selected patients at Queen Mary and Ste. Anne's Veterans' Hospitals with reserpine (Serpasil†). The study was done from August 15, 1954 to March 15, 1955, and is continuing. The history, pharmacology, experimental physiology and first North American clinical study have been reported elsewhere.[2, 3]

The psychiatric wards of Queen Mary Veterans' Hospital and the women's psychiatric unit at Ste. Anne's are open wards in general hospitals, i.e., they are no different in structure or organization from any of the medical or surgical wards. Patients are veterans, or serving military personnel, who we feel can be benefited by short-term (up to three months) intensive psychotherapy. Subcoma insulin, electro-convulsive therapy and gas therapy are used as adjuvants. The main accent is on psychotherapy, which is analytically oriented. No physician has more than 10 patients on the average, and it is thus possible to make intensive psychological and psychodynamic studies on all patients. Thus, a patient population with mainly neurotic conditions is treated, although many cases of borderline states and early schizophrenias are included. The early schizophrenias are so diagnosed on the basis of the intensity of the conflicts and evaluation of their resources rather than on the secondary symptoms of the disease, which are often absent at this stage.

We felt that this setting gave an excellent opportunity for psycho-physiological studies of the effects of the drug, which could not be done as adequately in the state hospitals with their hundreds of patients and relatively small staffs. We also felt that the criteria of improvement would be different, in many cases, in closed and open settings. For instance, from the state hospitals' point of view, a quiet and calm patient is better than an agitated and disturbed one. It does not necessarily follow, however, that the "quiet and calm" patient's thought processes and psychological state have significantly changed or changed for the better merely because he is quiet. We felt that a properly conducted study in our setting might contribute to these and other important points.

RESEARCH DESIGN

A severe therapeutic test was organized. Only patients with grossly measurable disorders of affect would be put on the drug, irrespective of diagnosis. By affect, we mean the emotion displayed by a patient as seen by an outside observer. A simple description or word picture of the patient's condition before taking the drug was written by the treating physician. The ward nurses made daily independent notes on the patient's condition. The treating physician made daily notes on the patient's condition independ-

*From the Psychiatric Service, Queen Mary Veterans' Hospital, Montreal, Dr. T. E. Dancey, Director. Presented at a meeting of the Section of Psychiatry, Montreal Medico-Chirurgical Society, March 17, 1955.

†Supplied through the courtesy of Dr. Walter Murphy, Associate Medical Director, Ciba Company Ltd.

ently. All the above were inscribed on special sheets. Separate daily charts of blood pressure, temperature, pulse, respirations and weight were kept before, during and after drug administration. The final summary of the patient's course was made when the drug was stopped. This included an enumeration of toxic and side-effects. A shock routine with norepinephrine was organized, but its use was never necessary, no patient's blood pressure falling below 85 mm. Hg systolic for half an hour or longer.

Psychotherapy.—Patients continued on psychotherapy, but were not allowed any other form of treatment while on the drug, such as ECT or subcoma insulin. We felt that it would have been artificial to pretend to "stop psychotherapy" and give only the drug, since a tremendous amount of treatment was offered by the hospital milieu and ward activities. A relationship of some sort with strong interchange of feeling would still have existed between physician and patient around the giving of the drug. The natural course of the disease and the available knowledge of the interpersonal relations and the psychodynamics made it possible for us, we felt, to judge which effects were due to the drug and which were due to psychotherapy.

Data were tabulated under the following headings: patient, age, diagnosis, presenting affect before drug, positive findings on physical examinations, dose, weight, appetite, œdema, blood pressure, temperature, pulse, respirations (before drug, during drug), and patient's subjective evaluation. The choices for appetite were "poor," "no change," "good." The choices for patient's subjective evaluation were: "helped," "not helped," "made worse." The overall results were listed under three headings: (1) The action on affect (choice "good" or "poor") and a word picture of the changes was included. (2) In another column an extrapolation of the major observable changes was given. (3) A third column gave the effects on "natural course of disease" ("changed" or "unchanged") and a comment clarifying this was made. This last-mentioned column was a most important one since we knew, from past experience, the overall general course of the illnesses treated by us. If while on the drug a drastic change in the course of the illness occurred which could not be attributed to psychotherapy, it was attributed to the drug. This was our major control, and, with the intensive knowledge we possessed of each patient, we felt it to be a valid one.

Side-effects and toxicity were listed and a final column entitled "disposal" told what eventually happened to the patient. Space does not permit us to list the results in detail under the above headings, but representative examples, and the overall conclusions, are presented in this paper, as well as the summarized crude data.

CRUDE DATA

Of the 37 patients—33 men and four women—8 were in their 20's, 12 in their 30's, 4 in their 40's, 8 in their 50's and 2 in their 60's. Twelve cases were diagnosed as schizophrenia, four as mania and schizo-affective reaction, 13 as depression in an obsessive-compulsive personality, one as chronic anxiety in an obsessive-compulsive personality, one as psychotic depression, two as obsessive-compulsive neurosis, one as conversion reaction, one as character neurosis, one as an anxiety reaction, and one as a toxic confusional state (CO poisoning).

The main symptoms were anxiety (11 patients), agitation and depression (7), depression and anxiety (7), hypomania and mania (5), acting out behaviour (3), and psychogenic pain (4).

The average dose of reserpine, administered orally or intramuscularly, was 7 mgm. a day. One patient received 1.2 mgm. a day, and the rest more than 2 mgm. a day; the highest daily dose was 40 mgm. For 34 patients the average period on the drug was over 25 days. Three patients were on the drug for less than 24 hours, and three for five or six days. The longest period was 66 days.

Of 31 patients, 7 gained 1 lb. or more a day for 7 to 14 days. The rest gained at the level of other patients. One depressed patient lost weight. The appetite was generally good.

In 31 patients the systolic B.P. fell 25-30 mm. Hg, and the diastolic B.P. 20 mm. Hg. In three of 34 patients the fall was not more than 10 mm. Hg. One patient was hypertensive (B.P. 190/110 on admission).

The pulse rate before administration of reserpine averaged 92 in 27 of 30 male patients, and fell during administration to an average of 64. The pulse rate of four female patients when asleep averaged 80, and on the drug it averaged 64. Pulse fell with blood pressure. Respirations varied between 16 and 20.

Subjectively, 23 of 36 patients felt "helped," and 13 felt "not helped" or "made worse." Objectively, the doctors felt that 25 of these patients had "good" results as regards affect. Twelve were considered "poor" results (no evidence of change was considered a poor result).

Of the 24 patients with "good" results, 13 changed from anxiety to the pre-morbid state, four changed from hypomania or mania to the pre-morbid state, two from mixed affective states to the pre-morbid state, and five from agitation or panic to the pre-morbid state. A toxic confusional state (CO poisoning) in one patient cleared up quickly and was not classified. Of 12 patients with poor results as regards affect, five showed fear of changes in body image or bodily integrity; four showed fear of increased passivity; one refused to give up secondary gains; one interpreted the drug administration as an assault or a seduction; and one depressed patient showed no apparent change.

We felt that in five cases the natural course of the illness was changed. The first was a 52-year-old man with one year's history of an agitated depression; on the drug, agitation stopped abruptly. The second patient used motor and social activity as a defence mechanism; the drug removed this and he became psychotic. The third had an acute episode of panic with paranoid delusions; the panic was terminated in less than 24 hours with regaining of reality testing. The fourth had a 10-year pattern of periodic acute psychotic episodes with alcoholism; this pattern was changed. The fifth had hypomania and did not develop the manic phase seen in previous attacks; the hypomania was controlled and cleared up in two months, whereas previous attacks had required ECT.

Side-effects and toxicity included nasal stuffiness (13 patients), nausea (3), nausea and vomiting (6), diarrhœa (9), erythematous skin reaction (5), headache (3), œdema (3), and "tight shoes" (2). Of the cases with œdema, one was not diagnosed, one occurred in a patient with hypoproteinæmia, and one occurred in a one-legged man with a history of post-traumatic œdema in the remaining limb. Two patients complained of "tight shoes". All toxic phenomena cleared up spontaneously. In one case œdema necessitated interruption of treatment but cleared up within a week of this. There was no instance of lasting toxicity.

RESULTS

The drug:

1. Produces a constant fall in B.P. and a bradycardia in the majority of cases.
2. Slows down spontaneous movements, and purposeless movements such as pacing the floor, tremor, hand wringing, and senseless fumblings.
3. Slows down, sedates, calms, and chemically "holds down the patient"; it makes the patient feel weak, tired, sleepy and occasionally dizzy.
4. Stops motor overactivity if used in sufficient dosage.
5. Leaves the patient able to move components of his body, but tending to move body, head and arms in one block; he can voluntarily do otherwise, but does not tend to do so.
6. Does not change affect-tinged impulses *per se*, but rather lessens the tendency to translate impulse into action, as compared to thoughts.
7. Leaves the sensorium clear at all doses. The patient retains the capacity to think and to concentrate, when this was originally unimpaired.
8. Makes the patient feel drowsy and sleepy. Helps the patient go to sleep, but does not put the patient to sleep. The patient can resist and stay awake.
9. Produces light sleep, the patient being easily aroused.
10. When the patient is initially overactive, can produce what seems to be psychic slowing. In manic patients it sometimes seems to slow the speed with which thought is expressed, but it does not change the manic nature of the thoughts.
11. Induces a good appetite; weight gain was large in a significant number.
12. Can perhaps produce changes in water balance and electrolytes in high dosage. (Œdema, "tight shoes," rapid weight gain, somewhat elevated serum sodium and potassium levels in several cases.)
13. Commonly has side-effects. It is our impression that they are related to dose, and that perhaps lower dosage would produce fewer effects. In the doses used the drug is often unpleasant because of these.
14. Caused no serious or irreversible toxic effects or side-effects in our series.
15. Does not produce euphoria, nor does it seem to offer a high risk of addiction. There was no evidence of increasing tolerance to it in this series.

An example of a good result on affect is given in some detail.

CASE 22

Mr. L.L. This 46-year-old man was admitted with a diagnosis of hypomania, showing overactivity, euphoria, and increased push of speech. He joked and was quick-witted but sad and despondent underneath. He was lucid, but irritable and impulsive, and his hostility was easily mobilized. He had had previous episodes which had gone on to full mania and had needed ECT. He had some awareness of his condition in the light of the above. He was given 10 mgm. reserpine intramuscularly stat., and then received 5 mgm. daily orally for 36 days. His weight went from 164 to 171 lb. and stabilized there after 14 days. He showed no œdema; his appetite, which had been good, improved on the drug. His blood pressure, pulse and respiration went from 130/90, 90, 20 before the drug to average levels of 100/70, 72, 18 while on the drug. Subjectively, he felt he was "helped." The results were: (1) On affect—good. He slowed up, became more irritable and overtly hostile for three days, and then became more docile and less apprehensive. His activity was slowed to pre-morbid levels, but impulsivity remained great. The main observable changes were that he became quieter, calmer, and less active, and was tired and sleepy and felt weak. (2) The natural course of the disease was changed. His activity was cut down to approximately pre-morbid levels. In view of his past history, it is doubtful whether without the drug a full manic episode would not have occurred. Side-effects were: conjunctivitis, flushing of face, and speech slurring within five minutes of an intramuscular dose of 10 mgm. Diarrhœa and nausea were present the first day, diarrhœa the second day. He was helped over the hypomanic phase, and made more easily accessible to psychotherapy as a result. He was discharged as improved after 1½ months' treatment.

Poor results.—Twelve patients did badly on the drug as judged by their affective states. Patients who showed no change were included in this group. We felt that these cases could be broken down into several broad categories (see Crude Data).

We could sum up by saying that any patient who felt threatened by being calmed, made less active, becoming tired and feeling weaker, did badly. Those who interpreted the multiple unpleasant side-effects, as well as the above-mentioned physiological effects, as an impairment or change in their bodily integrity or body image also did badly. Those patients who interpreted the drug administration as an unwelcome assault or seduction did badly. It is important to point out our feeling that many of the good results of intramuscular administration involved unconscious gratification of the same need to be assaulted or seduced. However, the non-threatening and protective hospital milieu allowed safe gratification of these desires with beneficial results.

Patients with marked secondary gains (such as money or warm quarters in a cold winter) obviously did not do well on the drug.

A few words should be said about the male patients who fear increased passivity. There is a large group of patients who have marked unconscious conflicts over their sexual, social and intellectual potency. Many of these patients use activity in one or all of the above three fields as a means of reassuring themselves that they are adequate males. When patients use activity as the major defensive structure, removing it chemically, by rendering them incapable of energetic action, is very threatening and anxiety-producing. These patients consider activity to mean masculinity, and passivity (i.e. inactivity) to mean femininity. We have had patients do badly on both reserpine and chlorpromazine because of the above-mentioned psychic conflicts. In this study, four patients showed this as the major feature. There were five others (the body image and bodily integrity group) in whom this factor was operative as well, but to a lesser degree.

We feel most strongly that chemical interference with a patient's defence, imperfect though it may be, without substitution of something more useful to the patient can cause a further withdrawal and further breaks with reality (i.e. psychosis) because it leaves the patient with intolerable anxiety (see Dr. D. G. Wright's theory of schizophrenia[4]). Thus, for the same intrapsychic conflict, a better integrated defence allowing better contact with reality, e.g. activity, is chemically removed. Under the threat of the enforced relative passivity (meaning femininity) the patients sometimes react with poorer defences, including increased anxiety or further breaks with reality (psychosis).

A brief example of such a case follows:

CASE 11

Mr. G.A., a 25-year-old man. Diagnosis: character neurosis (acting out behaviour). Before receiving reserpine, he showed perplexity, indecision ambivalence, and ambi-tendency. He could not make up his mind as to the proper course, was somewhat sad and unhappy, and had a bland expression. He was anxious but masked all the above with a great need to move around, be tremendously active, and be unrestrained in his motor activity and in his social activity, such as drinking, going out, cashing bad cheques, or running up debts. His symptoms developed when he was removed from his paratrooper's job involving frequent jumping to one requiring very little actual duty or activity in a newly forming regiment. When frustrated in his outgoingness by being confined to the ward, he became increasingly tense and showed an inappropriate euphoria. He was given 2.5 mgm. reserpine intramuscularly four times a day for two days, 3 mgm. orally four times a day for 10 days, then 4 mgm. orally four times a day for 11 days. Weight went from 210 to 218 lb. in seven days, stabilizing at 218. There was no œdema. His appetite had been good, but the patient complained that he lost his "zest in eating" while on the drug. Blood pressure fell from 125/70 to 125/70-90/40, depending on the dose, stabilizing around 100/60 mm. Hg. Pulse rate fell from 80 to 60 (variation 80-56); respiration rate remained at 20. The patient felt that he was "worse." The

results in respect of affect were considered poor. The patient was slowed down; his motor activity was markedly cut; he was tired, drowsy, irritable, felt held down, and could move his body but moved it in one block although he was able to do otherwise. He was unhappy, jittery, and extremely anxious, felt cut off from life, "unable to sleep, unable to stay awake." Felt he was "going queer," felt cut off "from outside things," felt that his body was changing. Main observable changes were slowing down, inappropriate euphoria, panic at being chemically held, a feeling of change and dissociation and that there were changes in body image and motor control. The natural course of the disease was "changed for the worse," from an acting out person who mastered his anxiety through activity, to an inhibited, unhappy, frustrated man whose mental content became psychotic. The side-effect was nasal stuffiness. The patient was taken off the drug and returned to his pre-drug state. He was a very happy and relieved man at this, and remained with his acting out behaviour for the remaining month in hospital.

CONTRAINDICATIONS

This drug should not be used, or should be used with caution, in the following cases:

1. Patients who mask profound doubts over their masculinity by using social outgoingness, and intellectual and motor activity, as the major defence.
2. Cases of marked withdrawal without anxiety or conflict about this.
3. Depressive reactions without agitation or anxiety.
4. The early organic brain syndrome with anxiety and preoccupations about bodily integrity. The profound physiological and/or side-effects might increase this anxiety since they would not be understood.
5. Patients with marked preoccupation over body image or with ruminations over bodily integrity.
6. Patients to whom the administration of this drug or any other drug would be an unwelcome seduction or an assault.
7. All patients in whom obvious secondary gain makes the removal of symptoms improbable or impossible.

COMPARISON WITH CHLORPROMAZINE

One of us (W.O.) has previously published results of chlorpromazine treatment of 100 patients.[1] It is felt that the reactions of reserpine and chlorpromazine in psychiatry have greater similarity than difference. Although they are pharmacologically different, the overall effects on the psychiatric patient are very similar. Both have a limited but definite place in psychiatry; both have a quietening effect without impairing sensorium, concentration, or ability to think. Chlorpromazine is a faster-acting agent than reserpine and is therefore useful in emergencies. Reserpine does not seem to produce the jaundice seen with chlorpromazine (in around 3%). Both drugs can have unpleasant side-effects; although these are not identical, they are of approximately the same inconvenience to the patient. It is possible that, with reserpine, use of lower dosage than reported in this series would produce fewer side-effects.

CONCLUSIONS

Reserpine has a definite place in psychiatry. It is indicated in conditions in which anxiety or agitation renders the patient incapable of tolerating himself or relating to others. It is indicated in some conditions characterized by motor over-activity (see Contraindications for exceptions). It is indicated in certain depressions in which agitation and anxiety are major components. It will hold down all motor over-activity if the dose is sufficient. It is not a cure-all, and should not be used in an indiscriminate way, but together with psychotherapy. It is not in itself a "cure" for human problems. When a patient will gain in personal wellbeing by having his anxiety or activity controlled, it is indicated, but when the inereased slowing and enforced relative inactivity decreases the patient's sense of wellbeing, the patient is the loser. It should be used only on an individual case basis, with careful psychological and physiological studies. In this series, the patients' subjective impression of their state of wellbeing while on the drug coincided very closely with that of the physician.

We wish to thank the psychiatric and nursing staffs of the Queen Mary Veterans' Hospital who, by their clinical assistance, made this study possible. We are grateful to Dr. T. E. Dancey and Dr. S. Albert, who were helpful in clarifying, by their advice and invaluable suggestions, the final research design.

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PYRIDOXINE AND ACUTE INTOXICATION

It has been claimed that certain B vitamins, notably intravenous pyridoxine, are of value in treatment of acute alcoholic intoxication. Small *et al.* (*J. Lab. & Clin. Med.*, 46: 12, 1955) do not agree with these claims. They performed experiments on six alcoholic patients and observed no sobering-up effect after intravenous injection of up to one gram pyridoxine.

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THE MECHANISM OF ACUTE FERROUS SULPHATE POISONING

R. J. K. BROWN, M.B., B.Chir.(Cantab.), M.R.C.P., D.C.H.(Lond.),* *London, Eng.*
and J. D. GRAY, M.D.(McGill),† *Halifax, N.S.*

IN SPITE OF repeated warnings, acute iron poisoning in childhood is still of much too frequent occurrence. On reading the relevant literature it is plain that no entirely satisfactory explanation of its mechanism has as yet been advanced; its treatment must therefore remain empirical until more is known.

We record a case showing some hitherto unpublished facts. The speculations which followed the clinical observations have led to some experimental work, the outcome of which is also embodied in this paper.

Clinical.—At 4 p.m. on October 5, 1953, a 2-year-old boy swallowed 40 ferrous sulphate tablets. About 5 minutes later his mother returned to the room and saw what had happened. He was given a Seidlitz powder, after which he vomited a brown-stained fluid; very shortly thereafter he slid into semi-coma. At 4.35 p.m. he was admitted to King's College Hospital where his stomach was washed out with a 25% sodii bicarbonate solution; this returned a dark brown fluid with fragments of tablets. A few ounces of solution were left in the stomach.

One hour and fifteen minutes after ingestion he was extremely cold and pale with slight cyanosis of the extremities and an almost imperceptible pulse at the wrist. The respirations were rapid and shallow. In three hours and fifteen minutes his general condition had improved, pulse 140 per minute, volume poor. B.P. 105/70, liver edge soft and at the costal margin. He had vomited small quantities of bright blood and passed copious soft black stool. Straight radiograph of the abdomen showed no radio-opaque material in the stomach or duodenum. Intravenous infusion of 5% glucose in 1/5 N. saline was started.

Up to about 19 hours after ingestion he continued to vomit mucus and bright red blood. He passed two more copious black stools. Urinary chlorides were absent. The infusion was then changed to normal saline, followed by two pints of casein hydrolysate and compound vitamin B preparation.

Nineteen hours: now rational, vomited coffee-ground substance. He developed a loose cough and was pyrexial; chest examination, however, revealed no moist sounds.

Twenty-five hours: urine contained bilirubin, acetone, reducing substance and chlorides, but no albumin; oral methionine and vitamin E therapy begun.

Thirty-one hours: his condition was deteriorating, he was drowsy and restless and had a high-pitched cry. Pulse and respiratory rates were increased, reflexes depressed. Plantar response flexor.

Forty-two hours: he was by now deeply comatose, the breathing stertorous. He had an occasional mild convulsion. Slight jaundice was noted and the liver was now one finger-breadth below the costal margin. His face was puffy and suggested œdema; abdominal reflexes were absent; the plantar responses were now extensor. His urine had the "raw meat" smell of amino acids. Bilirubin was present. Paper chromatography confirmed the abundance of urinary amino acids. He was given intramuscular paraldehyde to control the fits.

Forty-six hours: convulsions still occurring. The pulse was rapid and feeble, the respirations were irregular and shallow. One gram of potassium was added to the intravenous solution (see biochemical findings). The bed was tilted head down and the nasopharynx sucked out. There were palpable and audible coarse rhonchi in the chest. He was now obviously jaundiced. The liver edge was firm and 1½ finger-breadths below the costal margin. Glutamic acid therapy was begun; 250,000 units of penicillin 6-hourly was also started.

Fifty-six hours: when seen at this time he was in a quiet deep sleep with regular respirations. Considerable œdema was present, the jaundice was deepening. The liver was still enlarged. Glutamic acid treatment was continued.

Seventy hours: still rather drowsy, pulse full and bounding; B.P. 130/50. The urine was less dark and the amino acid output decreased.

Four days: he was mentally normal but very weak. The jaundice was still present. There was pitting œdema of the ankles and sacrum. The chest was radiographically normal. The liver was firm and felt two finger-breadths below the costal margin.

Seven days: the general improvement had continued although the liver was still enlarged. Intravenous therapy was discontinued. From now on it became obvious that he was developing pyloric stenosis; a month later, this complication was relieved by gastroenterostomy. At the time of operation a piece of liver was taken for biopsy. Histological examination of the section showed normal architecture with slight increase in the reticuloendothelial cells which contained some iron pigment.

Biochemical findings.—Forty-two hours after ingestion his serum sodium, plasma chlorides, alkali reserve, blood urea, blood sugar, serum calcium and alkaline phosphatase were all within normal limits. The cerebrospinal fluid was normal. Serum potassium was 9.2 mgm. % (2.4 mEq./litre). Direct van den Bergh positive. Bilirubin 6.5 mgm %; at the end of 7 days this had dropped to 2 mgm. %. Four days after ingestion the urinary iron output over 24 hours was 2.8 mgm. % (normal 0.5-1 mgm.). The serum iron was 5.45 mgm. % three hours, 430 µgm. 42 hours, 153 µgm. 56 hours, 57 µgm. 4 days and 149 µgm. 7 days after ingestion. Combining power was nil after 4 days and 75 after 7 days. The changes in plasma proteins are shown in Table I.

Experimental methods and materials. — 1.5 gm. of analar grade ferrous sulphate was dissolved in 10 ml. sterile distilled water; this solution was kept sealed under partial vacuum until required, in order to prevent the oxidation of the ferrous salt. It was made up about two hours before use. Rabbits were the experimental animals. Ten were selected weighing between 1.6 and 2.2 kgm. and 0.5 ml. of the ferrous sulphate solution containing 75 mgm. of the salt was injected into the marginal ear vein of each animal. A further three were chosen as controls; 0.5 ml. of sterile distilled water was given by the same route to each. Four of the test animals died within 24 hours, one was killed 24 hours after injection, two at 2, one at 3, one at 6 and one at 10 days. The controls were killed 1 day, 2 days and 3 days after the administration of water. Brain, liver, spleen and kidneys were removed from all animals after death, fixed in 5% formol saline and stained by hæmatoxylin and eosin and the Prussian blue reaction for histological examination. Plasma proteins were estimated by the micro-Kjeldahl method and identified by paper chromatography; plasma amino acid nitrogen by the method of Danielson.

*Children's Department, King's College Hospital, and the Belgrave Hospital for Children, London, England.
†Pathological Department, Halifax Infirmary, Halifax, N.S.

TABLE I.

THE EFFECT OF ACUTE FERROUS SULPHATE POISONING ON PLASMA PROTEIN

Time after ingestion	*Turbidity tests*	*Serum Proteins albumin gm. %*	*globulin gm. %*	*Electrophoretic pattern*	*Ppt. of protein with tungstic acid*
42 hours	Clear solution	3.11	0.84	?Decrease of globulin	Normal cloud
56 hours	——	5.24*	0.24	No proteins detected	No precipitation
7 days	1 unit	3.40	0.95	Normal pattern	Normal cloud
15 days	1 unit	——	——	?Additional band	Normal cloud

*As no protein bands were detected on electrophoresis and tungstic acid precipitation did not occur, these figures are interpreted as representing non-protein nitrogen.

Results.—Ferrous sulphate (Fe_2 SO_4. 7 H_2O) has a molecular weight of 278. The atomic weight of iron, being 55.8, is equivalent to one-fifth the weight of the salt; therefore 75 mgm. of ferrous sulphate, the dosage used in these experiments, would contain 15.5 mgm. of Fe ++. The actual amount given in mgm. per kgm. body weight and its effect on the survival rate are shown in Table II.

TABLE II.

THE INTRAVENOUS DOSAGE OF FERROUS SULPHATE AND IRON IN MGM. PER KGM. AND ITS EFFECT ON SURVIVAL RATE

Rabbit No.	Fe_2 SO_4 7 H_2O *mgm. per kgm.*	Fe ++ *mgm. per kgm.*	*Survival and time*
1	47.0	9.4	8 hours
2	47.5	9.5	16 "
3	47.0	9.4	16 "
4	46.0	9.3	24 "
5	44.0	8.8	Killed at 24 hours
6	40.0	8.0	" " 48 "
7	40.0	8.0	" " 48 "
8	37.0	7.4	" " 72 "
9	36.0	7.3	" " 6 days
10	35.0	7.0	" " 10 "

The minimum lethal dose of ferrous sulphate appears to be about 46 mgm. per kgm. or 9.3 mgm. of Fe ++ per kgm. for rabbits. The amount required to bring about death within 24 hours is critical, for it will be noted that rabbit No. 5 survived this length of time on a dose of ferrous sulphate that was only 2 mgm., or 0.5 mgm. Fe ++ per kgm. less than that which killed the preceding animal. Using guinea pigs, Edge and Somers[1] found 6.1 mgm. of Fe ++ per kgm. was the lethal quantity, which accords reasonably well with our findings when species difference is taken into account.

The immediate effect of the introduction of ferrous sulphate into the animal circulation was striking. It has previously been described by Somers.[2] A few seconds after the injection was completed the animals were prostrated, lying on their stomachs with head lolling to one side, the hind legs outstretched; the respiratory rate increased; the bladder and the bowels emptied; and occasional short, sharp contractions of the hind limbs were seen. After about 15 minutes a partial recovery set in. It was noted that those animals still very ill when returned to the animal house subsequently died within 24 hours.

In seven experimental animals and in the three controls the plasma proteins and plasma amino acid nitrogen were measured. In 4 experimental and 1 control the partition of globulins was examined by paper chromatography. The effect of intravenous ferrous sulphate on these is shown in Table III. The histological changes found in the organs of the experimental animals were as follows:

Liver.—In death occurring under 12 hours: the lobular pattern is normal. The portal vessels and most of the sinusoids are filled with blood, the latter most marked at the lobule periphery. The parenchymal cells are œdematous, the cytoplasm foamy, the nucleus normal. The Kupffer cells, particularly those nearest the portal areas, contain iron; there is little to be seen in the cells of the parenchyma (Fig. 1). From 12-24 hours: patchy variations in parenchyma cell size appear. In some areas the cells are so œdematous that there is a concomitant sinusoidal obliteration, in others there has been some cell shrinkage. The vascular tree is still engorged. The cytoplasm of the parenchymal cells now shows vacuolation. The nucleus is still normal. There is a heavy concentration of iron in the Kupffer cells appearing as minute dots with a perinuclear distribution; the iron has also appeared in some of the parenchymal cells, again with a perinuclear distribution. The deposit of iron within the lobules is variable. In some it extends from the portal areas to the central vein, in others a third to half a lobule is affected. The spread, however, seems to be peripheral to central, for whenever part of a lobule is affected it is nearly always peripheral.

From 24-48 hours: large areas of coagulation necrosis are present. The nuclei in the parenchymal cells of the

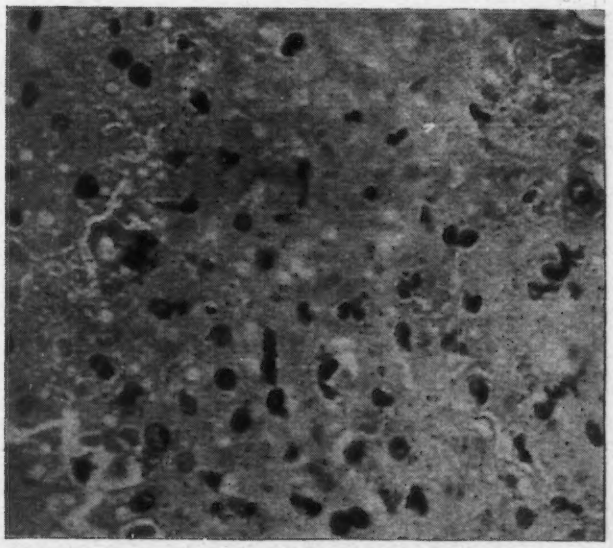

Fig. 1.—Section from the liver of a rabbit dying 8 hours after an intravenous dose of ferrous sulphate. The Kupffer cells are loaded with iron; the parenchymal cells, relatively free. Prussian blue reaction x 360.

TABLE III.

THE EFFECT OF-INTRAVENOUS FERROUS SULPHATE ON PLASMA PROTEINS, PLASMA AMINO ACID NITROGEN, AND GLOBULIN PARTITION IN RABBITS

	Plasma proteins gm. %			*Globulin partition*			
Time of death after dose	*Total*	*Albumin*	*Globulin*	*Amino acid nitrogen mgm. %*	γ	α	β
24 hours and under	5.1	4.88	0.22	—	+	0	0
1							
2	3.78	3.78	0	18.5	—	—	—
48 hours							
1	5.3	3.50	1.8	10.2	+	+	0
2	4.41	2.67	1.74	9.0	+	+	0
3 days	6.51	4.60	1.91	8.1	—	—	—
6 days	5.1	3.5	1.60	9.9	+	+	+
10 days	6.54	4.17	2.37	4.2	—	—	—
Controls							
1	6.7	4.44	2.26	7.8	+	+	+
2	6.83	3.50	3.33	6.6	—	—	—
3	6.25	3.7	2.55	7.0	—	—	—

The presence of a specific globulin on the paper strip is indicated in the table by + and its absence by 0.

necrotic parts show pyknosis and fragmentation. Vascular engorgement has reached its maximum. The iron has moved out of the Kupffer cells, for they are now relatively free of its deposit. Parenchymal cells show the metal in two forms. In some its presence is indicated by multiple blue dots, in others—and these appear to be the majority—as a diffuse bluish cytoplasmic "smoke" with no evidence of droplet formation. Some of the canaliculi contain iron "thrombi."

At 48 hours coagulation necrosis has increased in extent, and there is a moderate infiltration of eosinophils along many of the remaining sinusoids. Most of the iron has been removed, for only an occasional cell gives a positive Prussian blue reaction. At the third day the histological picture shows little change from that described at 48 hours.

At six days there is no apparent difference between the livers of control and test animals histologically.

Spleen.—In death under 12 hours: the splenic sinuses are so packed with red blood cells as to give the lympho-endothelial tissue an appearance of islands in a sea of blood. There is no evidence of necrosis. Scattered phagocytes are filled with iron granules. From 12-24 hours: the hæmorrhage is still present. Lying in an occasional relatively unobscured sinus is a clear bluish fluid whose characteristics suggest an iron bound protein-complex. At 48 hours: the hæmorrhage has abated, the normal splenic pattern is returning. The protein-iron-complex

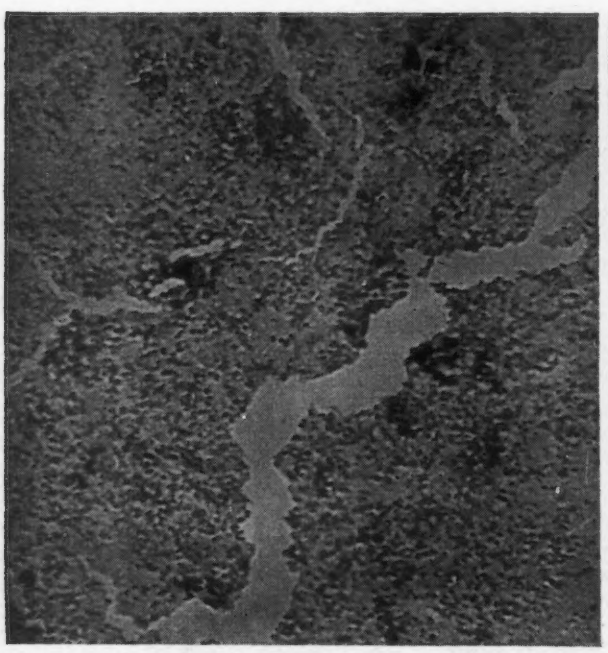

Fig. 2

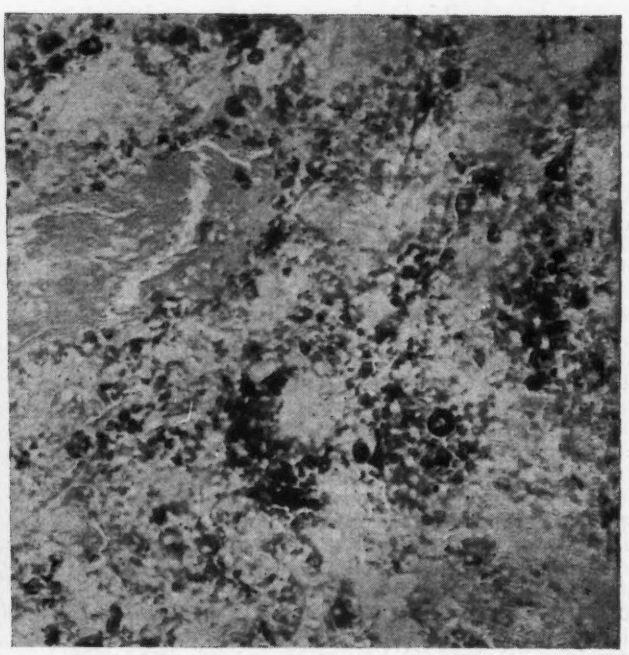

Fig. 3

Fig. 2.—Section from the spleen of a control rabbit, showing few scattered deposits of iron. Prussian blue reaction x 90. Fig. 3.—Section from the spleen of a rabbit killed 10 days after an intravenous dose of ferrous sulphate, showing the storage of unwanted metal in the organ. Prussian blue reaction x 360.

is not present, and there appears to be a considerable deposition of iron in the sinus lining cells.

From the third day onward the spleens of the control and test animals are in general similar, but the amount of iron stored in the tissue histiocytes appears greater in test animals than that shown in controls. This impression is confirmed when the spleen of the animal killed 10 days after the administration of ferrous sulphate is compared with that of the untreated one. It would seem that from the third day onward, iron which has not been excreted is gradually "buried" in the spleen (Figs. 2 and 3).

Kidneys.—In death under 12 hours: the glomerular capillaries are dilated and engorged with red blood cells. The interstitial vessels are congested. There is no evidence of iron in any part of the nephron. From 12-24 hours: the vascular congestion has increased. The epithelium shows cloudy swelling. Between the glomerular tuft and the capsule, the same protein-iron-complex seen in the splenic sinuses is present; it can also be found in the lumina of some of the proximal and distal convoluted tubules (Fig. 4). From 24-48 hours: the vascular congestion is much less marked. Cloudy swelling of the epithelium is still present. There is a colourless protein in the lumina of the straight tubules. From the third day onward there is no essential difference between the test and control kidneys.

Brain.—No alteration in the normal histological pattern could be found in any sections examined during the period of observation.

Lung.—In death under 12 hours: the pulmonary vessels and alveolar capillaries are stuffed with red blood cells. There is considerable œdema of the alveolar walls. The alveoli themselves are free of exudate. There are patchy areas of lung collapse. Some of the intracapillary phagocytes contain iron droplets. From 24-48 hours: there is a marked lessening in the vascular congestion. Œdema of the alveolar walls is still present and some of the alveoli contain an acellular exudate. A few histiocytes give a positive Prussian blue reaction. By the third day the lung approximates the normal.

A comparison between the clinical findings and experimental results is shown below.

The patient poisoned himself by absorbing unknown quantities of iron from the gut, whereas the rabbits were poisoned by a single intravenous dose. In the experiment, artificial continuity is obtained by building a composite picture from the effects of the metal in a series of rabbits with a variable time factor; yet there is surprising agreement between the findings in each.

During a ten-year period up to the end of 1953 there were 11 patients admitted to King's College Hospital or the Belgrave Hospital with iron poisoning. In one, the poisonous substance was ferrous gluconate; in the remainder, compound tablets of ferrous sulphate. There were no deaths, but in three patients the illness was severe and in one it was critical (the case described in this paper). In one other patient definite hepatic enlargement was noted at 36 hours though no anxiety was felt about her general condition. Serum iron in this patient was 872 µgm. per 100 ml. after three hours. The complication of pyloric stenosis has been observed twice in this series.

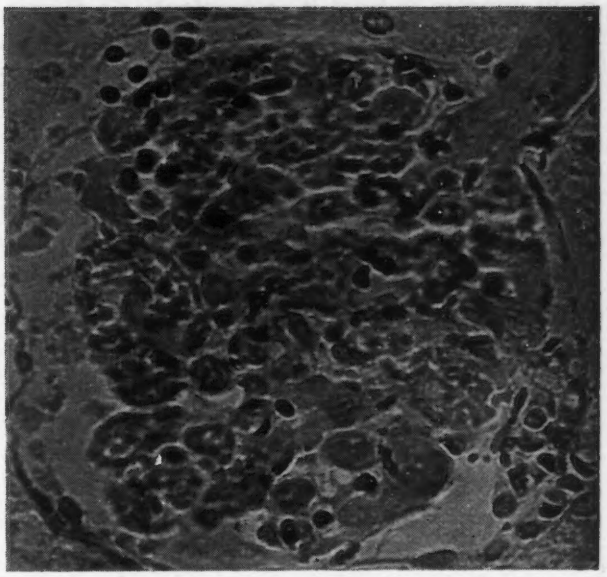

Fig. 4.—Section from the kidney of a rabbit dying 20 hours after a dose of ferrous sulphate intravenously. A protein-iron-complex is filling the glomerular vascular tree. Prussian blue reaction x 360.

DISCUSSION

The movement of iron from the gut to the tissue of utilization is a complex procedure. The rate of dissociation of iron salts is equated to acidity; therefore absorption takes place, for all practical purposes, in the stomach and upper small bowel. Entrance into the receptor cells of the mucosa is dependent on the presence of apoferritin; if the available concentration has already been converted to ferritin, iron absorption is blocked until the metal in the gut mucosa can be transferred to the plasma. It is moved in the latter in the form of ferric beta globulin; in turn, plasma iron can only be stored in tissue as ferritin. Iron may be essential for life but the

Time after poisoning	*Clinical*	*Experimental*
0 - 12 hours	Period of shock. Liver not enlarged.	Period of shock. Marked reduction in plasma globulin. Histological changes in liver slight.
12 - 24 hours	Apparent improvement. Evidence of liver damage.	Necrosis of liver. Rise of plasma amino acids.
24 - 48 hours	Condition deteriorating. Reduction in plasma globulin. Liver enlarged. Jaundice present.	Necrosis of liver. Plasma globulin reduced. Beta globulin absent. Plasma amino acids raised.
48 - 56 hours	Comatose. Liver enlarged. Jaundice increased. No protein detected in plasma.	Necrosis of liver. Plasma globulin low. Beta globulin not present. Plasma amino acids raised.
72 hours	Improvement apparent. Liver function returning.	Liver damage still evident. Plasma globulins still low and amino acids raised.
7 days	Improvement continuous. Liver still enlarged. Plasma globulins low.	Histologically, liver appears normal. Plasma globulins low. Globulin partition normal. Plasma amino acids still above normal.

body appears to treat it as a potentially dangerous criminal in need of constant guard, for at no time during the process of absorption, movement and utilization is it allowed to roam in a free ionized form.

Spencer[3] has shown that there are two critical periods in acute ferrous sulphate poisoning when death may occur. The first is within a few hours of taking the tablets and the second between 20 and 50 hours of ingestion. The cause of death in the first group has been ascribed to shock, the clinical picture of which was evident in the case we report and in the histological studies of the experimental animals. Smith,[4] basing his opinion on the work of Shorr *et al.*,[5] who showed that ferritin was a vasodepressant, considers that in iron poisoning excessive amounts of ferritin may be produced and released into the circulation, initiating and maintaining the vasomotor collapse characteristic of the early stages of the illness. However, the speed with which the shock was induced in the rabbits suggests a direct toxic action of the ferrous iron and leads us to put forward an alternative hypothesis: the hyperæmia and necrosis of the gastric mucosa which follow its exposure to large amounts of iron salts leads to a breakdown in the normal apoferritin-ferritin control mechanism. The plasma on becoming flooded with iron mobilizes both alpha and beta globulin to act as a protective ferric protein complex. Any iron left uncombined acts directly as a vasodepressant, thus precipitating the vascular collapse. Whether the vasomotor paralysis is central or peripheral we cannot say, although the absence of cerebral histological changes suggests the latter.

In the last analysis it may be that both excess circulating ferritin and uncombined iron cooperate in responsibility for this threat of death. In face of the evidence accumulating, there seems very little to support Spencer's suggestion that shock was an outcome of the large "wound area" in the upper alimentary tract following exposure to iron salts.

Alpha and beta globulin disappeared from the plasma of the rabbits and at the same time the concentration of iron in the reticulo-endothelial cells rose rapidly, suggesting that the globulins must enter these cells in order to deposit their iron and in doing so are destroyed. A certain amount of iron-bound protein was also lost by renal excretion. Replacement of protein is dependent on efficient synthesis; its production in the body is a function not only of the liver but also of certain extrahepatic tissues as well (Cheng[6]). It has been shown that the movement of large amounts of iron from the Kupffer to the parenchymal cells of the liver brings about cell necrosis by exposing the latter to iron in a free form. It would appear that the failure of hepatic function following necrosis plus the transient block of the reticulo-endothelial cells leads to a widespread depression of protein manufacture. This failure in synthesis was demonstrated in the rabbits by a concomitant rise in blood amino acid content; and in the patient the combination of protein loss and lack of production was so profound as to lead to an aproteinæmia which in turn led to tissue œdema. It is obvious that the changes in plasma protein will show variations in each case of iron poisoning, depending on its intensity. It should also be noted that in the livers of those animals sacrificed late in the experiment a normal histological picture was present when the globulin fraction of the plasma was still reduced and the blood amino acid concentration above normal. Nissim[7] considers that in iron poisoning functional damage is more serious than the histological appearances suggest.

The course of the patient's illness described in this report illustrated Spencer's second critical period. Forty-eight hours after the ingestion of iron he went into coma accompanied by convulsions. The changes occurred at the time of maximum hepatic damage and it would seem reasonable to consider that they probably arise from events following liver necrosis and blockage of the reticulo-endothelial system. The alteration in amino acid metabolism which followed could lead to glutamic acid deficiency, and, as glutamic acid is said to be necessary for the removal of the poisonous ammonium radicle in the central nervous system, its accumulation by the lack of an inactivator would result in the clinical picture described. It is of interest to note that ten hours after the start of glutamic acid therapy, the patient, although still very ill, had dramatically improved. It is our impression that sufficient liver function to maintain life will return with surprising rapidity, provided the patient can be tided over the period of hepatic coma.

A summary of the interpretation given to the facts gleaned clinically and experimentally is that, immediately after the ingestion and absorption of large amounts of iron, shock due to the presence of a circulating vasodepressant occurs;

subsequently there is protein loss by destruction and renal discharge, and at the same time protein synthesis is depressed by liver necrosis and the effects of reticulo-endothelial block. The destruction of protein and loss of synthesis lead to a hypoproteinæmia of varying degree accompanied by an alteration in amino acid metabolism, the latter manifested as a hepatic coma.

As regards treatment, the observations made suggest the necessity of early intravenous plasma infusion, probably of double or triple strength: firstly to combat shock, secondly to supply globulin for the absorption of "free" ferrous ions, thirdly to prevent osmotic imbalance which may be occasioned by protein loss. It is assumed that the preparation of dried plasma does not lead to the partial denaturation of protein which might invalidate its use for the second requirement. Whether vasomotor tone could be restored by the addition of noradrenaline (norepinephrine) to the infusion is worthy of consideration.

On theoretical grounds there seems indication for alternating the plasma infusion with one of casein hydrolysate. It is known that in Kinnier-Wilson disease copper chelates with amino acids for the purpose of elimination,[8] and it is possible that a similar mechanism took place between the hydrolysate given to the patient and the circulating iron, which may partly explain the unusually high urinary iron output seen on the fifth day of illness.

Although there is no proof that glutamic acid was responsible for the dramatic betterment that occurred after its exhibition following the diagnosis of hepatic coma, there is a good deal of evidence to suggest that its use was life-saving; consequently we feel it should be administered to any patient suffering from iron poisoning where hepatic coma has supervened.

There are two points in the general management of these cases that require mention. It has been shown that a transient, but profound, alteration takes place in the lung alveolar walls and leads to an alveolar exudate. The possibility of this becoming secondarily infected, leading to a bronchopneumonia, is apparent and at some period in the illness an antibiotic cover will be required. During the period of coma, aspiration of vomit is a Damoclean threat. The adoption of a tilted head-down bed, the provision of a sucker ready for instant use and a well-briefed nursing staff are necessities if a needless loss of life is to be averted.

In an analysis of accidental poisoning in childhood Craig and Fraser[9] write: "The only poison which is both common and very dangerous in Britain at present is ferrous sulphate." It would seem high time that some attempt was made at further preventive measures which might minimize to some extent the grievous harm that an accidental overdose may bring about. Whether it is possible to incorporate a small dose of an emetic, such as ipecacuanha, in each tablet—as is now being done in the barbiturates—is surely worth consideration.

SUMMARY

A case of acute iron poisoning which led to severe alterations in both plasma proteins and liver function is described. Experimentally it has been shown that a transient saturation of the reticulo-endothelial system with iron, necrosis of the liver, hypoglobulinæmia and raised blood amino-acid concentration follow acute ferrous sulphate poisoning in rabbits. Based on these findings, the mechanism of and therapeutic approach to acute iron poisoning are suggested.

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POLIO VACCINE AND THE KIDNEYS

"Fourteen hospitalized patients who received repeated injections of poliomyelitis vaccine prepared from monkey kidney tissue cultures were studied by serial Addis counts and clinical observation.

"There was no evidence from this investigation of the occurrence of clinical manifestations of kidney damage or injury. Unusual-appearing cells which could not be identified were noted in the urine of one patient, but their occurrence could not be attributed to the vaccine. Other clinical and laboratory observations in the group of patients studied revealed no evidence of untoward effects."—Neva, F. A. and Salk, J. E.: *J. Clin. & Lab. Med.*, 46: 21, 1955.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

KYNURENINE IN DISEASE, WITH PARTICULAR REFERENCE TO CANCER*

M. SPACEK, M.D., M.Sc., *Quebec, P.Q.*

THE TECHNICAL and physiological limitations affecting the significance of kynurenine determination in human urine have been discussed elsewhere.[1, 2] The analysis would be useful if it could be proved that disease affects the findings much more than, for instance, ordinary variations in the average man's diet. Such investigations are the subject of the present study.

MATERIALS AND METHODS

Twenty-four hour specimens of urine were used except in the cases of poliomyelitis with a case number over 22. No standardization of diet was attempted. This means that most of the advanced cancer patients were on a light diet with little tryptophan content. Most of the poliomyelitis patients, being children, were on the customary children's regimen. Other patients were taking whatever is usual in the respective condition.

Kynurenine was determined by a procedure described elsewhere.[1]

RESULTS

Table I gives the data obtained in this survey. These were used to compare averages for the different groups of diseases (Table II) and to compare percentages of "abnormal" results. Figures were considered abnormal when they were above the average[2] for normal adults over 30 years of age plus the mean deviation from this average, i.e. above 0.32 mgm. per 100 ml. The much lower normal range for young adults (0.096 ± 0.041 mgm. per 100 ml.) is used for comparison in the group of poliomyelitis cases. Even this will give too high a percentage of abnormal results in this group because a considerable proportion were not adults.

The patients themselves were divided into four groups. Group I includes cases of malignant tumour which were either not yet treated, inoperable, or fit only for palliative treatment. Treated cases were also included where the diagnosis was definitely established but no evidence was obtained suggestive of at least a temporary cure. The table is arranged in subgroups according to the site of the tumour. Group II (cases marked with an asterisk) comprises several cases in which malignancy was only suspected. The majority were in patients after supposedly complete removal of an accessible tumour. Regional metastases, where diagnosed, had been extensively irradiated. Group III are poliomyelitis patients. About half had been ill for less than three weeks and the rest were being treated for sequelæ. Those over 30 years of age are shown in sub-group IIIa. Group IV: miscellaneous diseases including tuberculosis (IVa) form the last group.

Table II shows in all groups except I and III essentially the same average urinary concentration of kynurenine as in normal adults over 30 years. Group III (poliomyelitis) comprises children and young adults. The nearest comparable normal group is one previously reported,[2] of students about 20 years old; the two give practically the same average (0.070 mgm. per 100 ml. for Group III and 0.095 mgm. for the students).

When we consider the influence of age it is obvious that, on the average, urinary concentrations of kynurenine are normal in most common diseases except cancer. The average in malignant disease is nearly twice that found in the other diseases and well outside the previously defined range of normal values.

There is a very marked difference between groups I and II, the latter giving a normal average, whereas the average in the former is more than twice that in normal persons. These findings indicate that there is a relationship between malignancy and urinary kynurenine.

DISCUSSION

The number of observations is certainly too small to allow comparison between different types of tumours on the basis of average figures alone, and it will be attempted later using further considerations. The statistical approach is, of course, inferior to an experimental study, and it is only used here *faute de mieux*. The validity of any conclusions based on consideration of average findings is put in doubt as soon as we examine Table I more closely. The high averages obviously result from comparatively few exceedingly high figures, the majority of cases being within the normal range in all groups (except the small sub-group of cancer of the prostate).

Figures illustrating this observation are given

*From the Department of Health and Welfare, Charlottetown, P.E.I., and the Department of Biochemistry, Laval University, Quebec, P.Q.

TABLE I.

URINARY EXCRETION OF KYNURENINE IN DISEASE (IN MGM. PER 100 ML.)

Groups I and II. Malignant diseases. (Group II is marked with an asterisk.)

No.	Mgm.
Carcinoma of rectum or sigmoid	
1.	0.14
2.	0.10
3.	0.11
4.	0.13
5.	0.20
6.	0.31
7.	0.44
8.	0.52
9.	0.70
10.	2.37
11.*	0.42
12.*	0.35
13.*	0.12
14.	0.47
15.	0.45
16.	0.11
Average:	0.434
Carcinoma of lung	
1.*	0.09
2.	0.06
3.	0.19
4.	0.27
5.	0.74
6.	0.84
Average:	0.365
Carcinoma of breast	
1.	0.07
2.	0.08
3.	0.10
4.	0.11
5.	0.12
6.	0.19
7.	0.19
8.	0.20
9.	0.24
10.	0.42
11.	0.18
12.	0.28
13.	0.35
14.	0.80
15.	0.80
16.*	0.47
17.*	0.12
18.*	0.11
19.*	0.11
20.*	0.14
21.*	0.09
Average:	0.245
Carcinoma of prostate	
1.	0.07
2.	0.10
3.	0.07
4.	0.12
5.	0.24
6.	0.50
7.	0.49
8.	0.55
9.	1.06
10.	1.66
11.	1.38
12.	0.27
13.*	0.26
14.	0.57
Average:	0.524

No.	Mgm.
Carcinoma of uterus	
1.	0.08
2.	0.10
3.	0.13
4.	0.17
5.	0.19
6.	0.25
7.	0.27
8.	0.54
9.	0.44
10.*	0.06
11.*	0.12
12.*	0.34
Average:	0.224
Leukaemia, Lymphosarcoma, Hodgkin's disease	
1.	0.20
2.	0.22
3.	0.18
4.	0.45
5.	1.52
6.*	1.16
Average:	0.622
Miscellaneous carcinomas	
1.	0.07
2.	0.13
3.	0.16
4.	0.19
5.	0.16
6.	0.23
7.	0.24
8.	0.11
9.	0.38
10.	0.41
11.	0.35
12.	0.21
13.	0.28
14.	0.34
15.	0.19
16.	0.27
17.	0.45
18.	1.77
19.	2.50
20.*	0.07
21.*	0.05
22.*	0.14
23.*	0.15
24.*	0.21
25.*	0.08
26.*	0.09
27.*	0.10
28.*	0.12
29.*	0.12
30.*	0.29
31.*	0.47
Average:	0.333

Group III.

No.	Mgm.
Poliomyelitis	
1.	0.00
2.	0.00
3.	0.16
4.	0.10
5.	0.13
6.	0.10
7.	0.07
8.	0.10
9.	0.09
10.	0.13
11.	0.09
12.	0.06
13.	0.03
14.	0.06
15.	0.15
16.	0.06
17.	0.19
18.	0.03
19.	0.13
20.	0.12
21.	0.16
22.	0.05
23.	0.06
24.	0.12
25.	0.12
26.	0.07
27.	0.05
28.	0.05
29.	0.14
30.	0.10
31.	0.24
32.	0.14
33.	0.10
34.	0.15
35.	0.05
36.	0.06
37.	0.15
Average:	0.098

Group III-a

Poliomyelitis	
1.	0.00
2.	0.06
3.	0.07
4.	0.14
5.	0.34
6.	0.90
Average:	0.252

Group IV.

No.	Mgm.
Miscellaneous Diseases	
1.	0.03
2.	0.08
3.	0.13
4.	0.14
5.	0.18
6.	0.03
7.	0.11
8.	0.03
9.	0.09
10.	0.13
11.	0.14
12.	0.07
13.	0.06
14.	0.19
15.	0.20
16.	0.20
17.	0.17
18.	0.21
19.	0.22
20.	0.25
21.	0.28
22.	0.30
23.	0.29
24.	0.30
25.	0.33
26.	0.43
Average:	0.177

Group IV-a

Pulmonary tuberculosis	
1.	0.05
2.	0.07
3.	0.07
4.	0.10
5.	0.12
6.	0.14
7.	0.13
8.	0.11
9.	0.15
10.	0.17
11.	0.28
12.	0.36
13.	0.69
14.	0.23
15.	0.26
Average:	0.195

in Table II. Even if Group I alone is considered significant, we obtain a rather low percentage (40%) of abnormal findings in malignancy. This percentage of "abnormal" results is, however, significantly higher than the 13% for all other diseases combined.

The low percentage of positive results may be due to several causes. It must be remembered that the survey includes few patients examined before any treatment was started. Possibly even group I includes a number of cases with insufficient malignant tissue to affect the metabolism. This point could only be decided by a study of cases followed up during treatment. It seems unlikely that a standardization of diet would affect the statistics, although it undoubtedly should be done in assessing an individual case.

TABLE II.

AVERAGE KYNURENINE CONCENTRATIONS (IN MGM. PER 100 ML.) AND INCIDENCE OF ABNORMAL RESULTS IN DIFFERENT DISEASES

Group	*I*	*II*	*III*	*III-a*	*IV*	*IV-a*	*All tumours (I and II)*	*III, IV & IV-a*
Average urinary kynurenine	0.412	0.217	0.098	0.252	0.177	0.195	0.362	0.192
% of abnormal results	39	11	11	33	8	13	32	13
Number of cases	79	27	37	6	26	15	106	47

TABLE III.

URINARY KYNURENINE AFTER ADMINISTRATION OF TRYPTOPHAN (IN MGM. PER 100 ML.)

*No.**	*Site of carcinoma*	*Kynurenine before tryptophan*	*Kynurenine after tryptophan*	*Increase*
7.	Rectum	0.44	0.75	0.31
15.	,,	0.45	1.00	0.55
16.	,,	0.11	2.83	2.72
5.	,,	0.20	0.47	0.27
2.	Lung	0.06	1.75	1.69
1.	Lymphosarcoma	0.20	0.40	0.20
12.	Breast	0.28	0.69	0.41
14.	Colon	0.47	2.60	2.13
5.	Uterus	0.19	0.28	0.09
–	,,	0.27	1.56	1.29
–	Prostate	0.10	0.22	0.12
5.	,,	0.24	1.05	0.81
–	,,	0.08	0.79	0.71
–	,,	1.66	3.51	1.85
–	Œsophagus	0.28	1.27	0.99
14.	Maxilla	0.34	0.77	0.43
–	Prostate	0.07	1.30	1.23
				Average: 0.93

*The numbers correspond with those in Table I.

The figures suggest on the whole that there is considerable overlapping of findings between the normal and malignant groups. Setting the "normal" values at a lower level would probably be to some extent justified, as the average figure for diseases other than cancer was actually lower than for the small group of normal persons,[2] and so was the incidence of "abnormal" values. Also, the cancer patients had on the whole a lower dietary tryptophan intake than others. But even setting the normal limit at the probable rather than the observed level does not remove the overlapping.

It remains to test the hypothesis that only certain types of malignancy give "positive" results. As far as our few observations allow any conclusion, Tables I and II hold out a hope that this may be true; cancer of the prostate gave both a rather high average kynurenine value and a high incidence of positive results, whereas the corresponding figures are low for cancer of the uterus. This does not, of course, constitute a conclusion; another attempt was made in which ten cases with conspicuously high kynurenine levels over 0.6 mgm. per 100 ml. were collected to see whether they had anything in common. The types observed were: carcinoma of prostate (3 cases), carcinoma of bladder (1 case), carcinoma of breast (2 cases), carcinoma of rectum (2 cases), and carcinoma of lung (2 cases).

Apparently no single type was prevalent. They were all patients with infiltrating growth and/or metastases; in other words, advanced cases. Two lived on a vegetarian diet, showing again that dietary tryptophan is not the only, perhaps not even the most important, source of kynurenine.

The present study does not explain the high kynurenine values in malignancy. Kynurenine certainly is not the causative agent in cancer. The possibility which seems most likely is that the kynurenine is formed mainly from endogenous tryptophan, originating from the destruction of tissue proteins. This has been long known to occur in malignancy to a greater extent than in health. The apparently very malignant character of tumours where kynurenine values were highest somewhat supports this hypothesis.

It is also possible that some tissue of patients with tumours converts tryptophan into kynurenine more readily than in health. Such patients, if offered tryptophan, should excrete more kynurenine than normal persons. The average increase of kynurenine concentration in 12-hour specimens after 1.5 gm. of L-tryptophan was calculated from data published elsewhere[2] as 0.38 mgm. per 100 ml. urine. Similar tests in

malignancy (Table III) gave an average of 0.93 mgm. per 100 ml. The increase was more than 0.40 mgm. in 11 out of the 17 cases, apparently irrespective of the original concentration of kynurenine. More extensive studies will elucidate the significance of these findings.

CONCLUSIONS

The average concentration of urinary kynurenine in 106 patients with malignant tumours is about twice as high as the average either for healthy people or for patients suffering from any of the diseases investigated. The latter included poliomyelitis (43 cases), pulmonary tuberculosis (15 cases), and 26 patients with miscellaneous diseases.

A concentration of more than 0.32 mgm. per 100 ml. is considered abnormal. Such concentrations occurred in 32% of all cancer patients and 39% of cases presenting some indication of severity. The average incidence of abnormal results in all other diseases was 13%.

The average increase in urinary kynurenine after administration of tryptophan in patients with tumours was more than twice that in a small group of cancer-free persons. An "abnormally" high increase was found in the majority of cancer cases.

The incidence of abnormal results either before or after tryptophan appears too low to make the determination of kynurenine in the urine a test for malignancy. Nevertheless the findings indicate that there is a connection between malignant disease and the metabolism of tryptophan.

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ROTATOR CUFF TENDONITIS AND BICIPITAL TENOSYNOVITIS*

NORMAN C. DELARUE, M.D., *Toronto*

THE PROCESSES OF ATTRITION, as they affect the mechanics of functioning joints in the musculoskeletal system, occur most frequently, as might be expected, in those articulations subjected to weight-bearing stress. However, similar changes also occur in other joints not primarily in the weight-bearing axis of the body. In these latter instances, the supporting soft tissues usually bear the brunt of the functional stresses rather than the actual skeletal framework, and consequently demonstrate the pathological changes which are to be eventually responsible for the production of symptoms.

In the upper limb the shoulder is most subject to this type of disorder, due in large part to the great range of movement through which the joint may be activated in circumduction and the resultant friction to which the ensheathing soft tissues are subjected as they are repeatedly compressed between bony and ligamentous structures or affected by the moving end of the humerus lying immediately subjacent to the musculotendinous cuff. Actually, with heavy physical work, the strain imposed upon this inadequately articulated joint will of necessity throw a very great load indeed upon its muscular supports.

Being due to the constant wear and tear of such occupational stresses, the resulting diseases might be expected to become apparent as aging occurs, and this is certainly true. Apart from the occasional patient who, at a young age, indulges in activities entailing an unusual amount of muscular activity of the arm in above-shoulder-level positions (e.g. tennis players, baseball pitchers, painters, and carpenters), these lesions produce symptoms with increasing frequency after the age of 40 years. The coincidental loss of elasticity in the same structures as a result of senescent processes undoubtedly accelerates the

*From the Department of Surgery, Toronto General Hospital.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

appearance of disabling symptoms. With the fundamental factor one of friction or fraying, these attritional changes develop in two quite localized areas of the shoulder joint complex.

A. ROTATOR CUFF TENDONITIS

In the first instance, the rotator cuff tendons are continually subjected to functional stress when the greater tuberosity of the humerus impinges against the acromion and the acromial attachments of the coraco-acromial ligament with abduction, particularly beyond the range of 30°. This process involves primarily the supraspinatus tendon and the adjacent part of the infraspinatus tendon, and it is in these areas that the degenerative changes are most commonly encountered. Interposed between the rotator cuff tendons and the overhanging coraco-acromial arch, the subdeltoid bursa minimizes the effect of this fraying by the lubricating effect of its normally smooth walls, which glide so readily over one another. However, when the bursa has been secondarily affected by inflammatory changes arising in the irritated tendon or by the chemical irritation resulting when areas of calcareous degeneration in the tendon rupture into the bursal sac, the efficiency of the protective device is greatly diminished.

Clinically this inflammatory process in the tendon developing on the basis of traumatic fraying and subsequent degenerative change, occasionally of calcareous type, produces episodic attacks of shoulder pain and limitation of function of varying intensity. The pain may have a widespread radiation, although concentrated in areas having the same somatic nerve supply as the shoulder, and most commonly referred to the region of the deltoid insertion. It is aggravated by movements which result in compression of the involved tendon, and consequently abduction between the ranges of 60 and 110° is most seriously affected. Movements may be relatively free in minor attacks, and in these instances external rotation which partially prevents the impingement of the greater tuberosity on the acromion may allow abduction to be completed without undue pain.

Acute episodes of dramatic onset with complete immobility of the arm, which is carefully nursed against the body, may be of two major types:

1. The degenerated and weakened tendon may rupture in response to a sudden abduction strain against resistance as, for example, when in an unexpected fall the abducted arm is forced into the side against the resistance of the involved musculo-tendinous cuff. The rupture may be partial or complete, and differentiation may be possible only after the injection of local anæsthetic to relieve the patient of pain. If the tear is complete, stabilization of the humeral head in the glenoid fossa will be impossible and abduction therefore also impossible. In incomplete tears the fixation is sufficient to allow active abduction once pain has been controlled.

2. Acute continuous pain of excruciating character may also be produced by the sudden rupture of a calcareous deposit into the subdeltoid bursa. In this case the symptoms may be so severe that removal of the calcium either by aspiration and irrigation or else by surgical excision may be indicated.

B. BICIPITAL TENDONITIS
(*Bicipital tenosynovitis*)

In the second instance the continual gliding movement of the tendon of the long head of the biceps muscle in the intertubercular groove and across not only the raised cartilaginous margin of the humeral head but also the smooth articular cartilage of the head itself produces similar changes in the biceps tendon. These changes will be accelerated and intensified by any bony irregularities of the floor of the bicipital groove and in addition by any roughening of the lesser tuberosity of the humerus around which the tendon has to pass whenever the arm is externally rotated, the tendon being maintained in its anatomical position by the integrity of ligaments forming the roof and completing the margins of the bicipital tunnel. As in the case of the rotator cuff where a protective bursa is supplied, here too the body attempts to protect the tendon from these frictional stresses by the presence of a synovial sheath which provides a gliding mechanism. Again, however, traumatic and degenerative changes result in inflammatory processes which render this device inefficient as adhesions develop within the sheath itself. It is interesting to note that similar changes in the short head of the biceps, where repeated trauma is not a factor, are not described, nor is any protective bursa or sheath provided.

The clinical course in bicipital tenosynovitis is not as well recognized nor is diagnosis as easily or commonly made as in lesions of the musculo-

tendinous cuff. This situation derives quite probably from the fact that its occurrence has been appreciated only in more recent years, and a sufficiently acute index of suspicion has not therefore become a part of our diagnostic armamentarium. The symptoms are very similar to those of rotator cuff tendonitis, and a careful appraisal of the findings on physical examination is necessary in order to clarify the diagnosis. In this case, inflammatory changes in the tendon and its synovial sheath lead to a synovitis with swelling of the already redundant folds of the synovial membrane, particularly in the inferior portion of the joint, with many intrasynovial fibrinous adhesions (Fig. 1), resulting in gross limitation of movement until the pain and inflammation subside. In neglected or chronic cases, almost complete restriction of glenohumeral motion may persist and produce the clinical picture of a "frozen shoulder". This tragic end result of functional attrition is much more frequently encountered in bicipital tenosynovitis than in tendonitis of the rotator cuff due to these intra-articular changes. In the latter condition, the inflammatory lesion is primarily extra-articular and the synovial disease due to disuse and the œdema resulting from muscular inactivity. Recovery is therefore probable on resumption of muscular activity, whereas the intra-articular lesions in bicipital tenosynovitis are primarily inflammatory in origin and do not respond as readily to resumption of active use of the shoulder. In addition the inflamed tendon becomes adherent in its sheath and also to the bicipital groove, this fixation producing pain with shoulder movement when functional stress is applied to inflammatory adhesions which prevent the normal gliding movement of the tendon. The pain itself then, as is true also when the rotator cuff is involved, is responsible for further impairment of function due to the œdema attendant upon the protective muscular inactivity that is the inevitable result of functional discomfort.

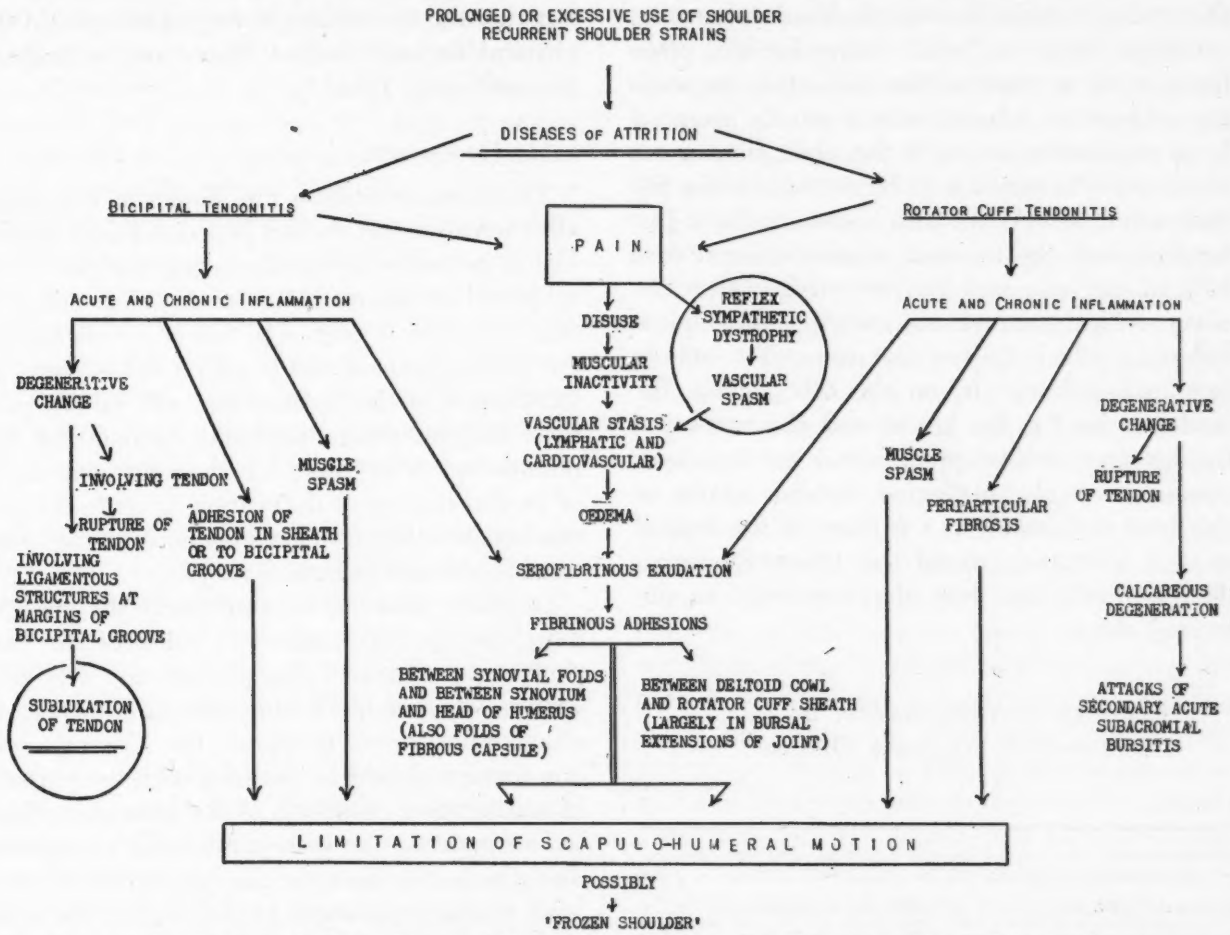

Fig. 1.—Degenerative shoulder disease. Pathogenesis of the resultant limitation of scapulohumeral motion.

Degenerative changes appear both in the tendon and the adjacent ligamentous margins of the roof of the intertubercular groove with œdema

Canad. M. A. J.
Aug. 1, 1955, vol. 73

and fragmentation of the fibrils. Consequently these structures are weakened and less able to resist abnormal strains encountered in joint use, particularly in external rotation when the tendon is stretched around the lesser tuberosity. If the supporting ligaments are sufficiently weakened, sudden strain may tear these ligaments and allow the tendon to dislocate over the lesser tuberosity, a sudden "snap" or "click" being felt and often heard at the moment of the dislocation. Impending subluxation subsequently is usually prefaced by a momentary arrest of the abduction or external rotation which is to be responsible for the dislocation, associated with mounting local discomfort until the moment when sudden release both of the pain and the restricting obstruction occurs with the actual subluxation of the tendon, following which further movement is relatively free and painless. If, on the other hand, the tendon is fixed in the groove and also weakened by the degenerative process and the ligaments remain relatively unaffected, sudden strains of this kind may result in a rupture of the tendon as it is stretched around the tuberosity rather than a dislocation over the tuberosity as described above.

C. CLINICAL DIFFERENTIATION IN DEGENERATIVE SHOULDER DISEASE

TABLE I.

DEGENERATIVE SHOULDER DISEASE—CLINICAL DIFFERENTIATION

Rotator cuff tendonitis	*Bicipital tenosynovitis*
Tenderness localized to extreme anterior deltoid prominence in line with acromioclavicular joint.	Tenderness along bicipital groove below anterior deltoid prominence lateral to anterior margin of deltoid muscle (may occasionally be possible to roll the actual tendon under the examining finger at the site of the localizing tenderness)
Abduction limited and painful between 60° and 100° (occasionally discomfort relieved by external rotation of arm)	Pain most marked usually in the position of abduction and external rotation
Abduction against resistance may aggravate discomfort particularly in position of approximately 30° abduction	Discomfort aggravated by following movements performed against resistance —Flexion of elbow —occasionally forward flexion of shoulder —supination of forearm —occasionally internal rotation of shoulder
Rough crepitus may be palpated over anterior aspect of shoulder but no snapping, dislocation or trick movements detected	Palpable (and often audible) subluxation may be detected on external rotation particularly in abducted position (confirms subjective sensation of "snapping" or dislocation)
Radiological evidence of calcification may be demonstrated in rotator cuff tendons	No calcification seen
Chronic "frozen shoulder" uncommon	Chronic "frozen shoulder" may be the end stage of this lesion

Although the patient complains of similar symptoms in both of these conditions with pain through the anterior shoulder region, often radiating into the antero-lateral aspect of the upper arm and occasionally into the anterior aspect of the forearm or up into the supraclavicular area, it is usually possible on clinical examination to separate the two by the history obtained and the physical findings elicited. The essential findings are outlined in Table I.

D. TREATMENT

These two conditions are, however, not mutually exclusive, and varying degrees of each pathological process may co-exist in any shoulder joint subjected to occupational stress. This will confuse the clinical diagnosis, but it is nonetheless the more advanced lesion which determines the localization of the findings and will usually produce the presenting complaints. Actually the differentiation in anything but the advanced stages of tendon rupture or dislocation or acute calcareous bursitis is largely academic because the treatment is identical in both diseases.

In either instance, it is primarily designed to meet two specific needs: (1) relief of the subjective complaints of the patient, and (2) prevention of permanent limitation of function of either minor or major proportion. Consequently any therapy should be outlined with the purpose of accelerating resolution of the processes which are responsible for these continuing complaints and which arise once the changes due to attrition have reached the stage of developing the reactions of acute and chronic inflammation and the subjective symptoms of pain. As can be appreciated from the accompanying figure (Fig. 1), these two factors produce the respective chains of events which lead to prolonged and permanent disability; only by reversal of these cycles can this important and constantly used joint be protected from such end results.

Pain, which is common to both conditions, is itself responsible in no small way for adhesions that develop in association with the vascular stasis which accompanies muscular inactivity. The acute discomfort is best relieved by the usual methods of applying heat, either with moist packs or by external radiant heat, although immediate ice packs are preferable when the catastrophic incidents of tendon rupture and dislocation or acute calcareous bursitis occur. In these instances local therapy of this kind

should be continued for several hours and heat avoided for the first 24 to 36 hours. Mild analgesic sedation is not contraindicated at this stage. Massage speeds the dispersal of the static sero-fibrinous exudate as well as accelerating the resolution of the inflammatory process and should be used following the application of local heat, when the draining vascular and lymphatic channels are at maximum dilatation and consequently most capable of accepting this dispersal. Rest during the early stages is necessary, usually with a sling support until the initial reaction subsides, primarily for relief of pain but also to prevent aggravation of the inflammatory process. As soon as possible, active physical exercises must be resumed in order to ensure rapid return of muscular activity. These therapeutic measures, as an integrated programme the rationale of which has been fully reviewed recently,[1, 2] are fundamental in the treatment of soft tissue injury and their importance cannot be over-emphasized.

Nonetheless, in this specific instance, the resumption of active muscle function at the earliest possible moment represents the key to successful therapy, because only in this way can limitation of scapulo-humeral motion be minimized. Exercises are prescribed within a day or two of the onset of the attack, beginning as always in shoulder lesions with pendulum exercises and graduating through abduction and external rotation movements to wall climbing and finally complete circumduction in both directions.[3] In the more common relatively mild attack, recovery should be complete within ten days to three weeks.

If the attack grumbles along beyond this period without subsiding or without acute exacerbations, great benefit may be obtained by the injection of 25 mgm. of hydrocortisone directly into the tender area of involved tendon. The injection may, after initial aggravation of the complaints, result in a dramatic alleviation of the pain and dysfunction, allowing subsequent progression to complete recovery. Therapy of this type may be repeated after four to five days when incomplete results are obtained from the initial injection.

The specific and more catastrophic conditions, tendon rupture and dislocation and acute bursitis secondary to the rupture of an area of calcareous degeneration into the subacromial bursa, require more definitive treatment. If they are seen shortly after the onset, the local application of ice packs is much more comforting than is heat in these instances, diminishing as it does the initial reaction and consequently the eventual inflammatory process, thus minimizing the resolution necessary for healing.[1] These applications should be continued for at least 30 minutes and preferably for one to two hours, with more adequate restriction of shoulder movement by an encircling bandage binding the humerus to the trunk in order to supplement simple sling support, with a view to preventing aggravation of the original injury.

Complete ruptures of the rotator cuff are then best handled by early suture and resumption of muscular activity within ten days to two weeks after the surgical procedure. Similarly, ruptures of the biceps tendon require early surgical intervention with removal of the intra-articular portion and suture of the distal portion of the tendon, either to the floor of the bicipital groove or to the coracoid process alongside the short head of the muscle. A dislocating bicipital tendon is treated in identical manner, and a case report is appended to illustrate the problem in this type of lesion. One may be certain from the sequence of events in this reported case that the correct diagnosis was not made before tendon dislocation became apparent, due largely to inadequate assessment of all the physical findings before this occurrence. The confusion was accentuated by the association of signs initially, indicating co-existence to a minor degree of degenerative change in the rotator cuff tendons, which was accepted as a logical basis for the presenting complaints at that time.

Involvement of the subacromial bursa by calcareous deposits frequently demands evacuation by aspiration or by surgical exploration through the overlying deltoid cowl, in which event relief is almost invariably obtained immediately, so that active movement may be resumed within a day or two. This is, in these instances, a highly satisfactory procedure and certainly hastens the eventual recovery of the patient.

E. "FROZEN SHOULDER"

As outlined previously, the complete restriction of gleno-humeral motion which is the dreaded outcome of these degenerative diseases is now felt to result primarily from the intra-

Canad. M. A. J.
Aug. 1, 1955, vol. 73

articular synovial changes, most frequently seen in bicipital tenosynovitis. Periarthritis is not thought to be as important as was previously believed, but the extra-articular supporting structures do, however, partake in the œdematous and inflammatory changes, and the resultant fibrosis may occasionally be a significant factor. Certainly fibrous contracture in the coraco-humeral ligament and subscapularis tendon anteriorly may limit external rotation, and similarly changes in the teres minor and infraspinatous tendons posteriorly may also limit internal rotation. Once fibrosis ensues, reversal of the pathological processes becomes impossible, and manipulation under anæsthesia may be the only recourse in therapy although it usually has little to offer in improving the range of active movement possible. It has been reported[4] on direct inspection at the time of surgical exploration that such manipulation, even when performed gently, may produce tears of the musculo-tendinous cuff in areas of degenerative change and may therefore result in increasing fixation due to subsequent inflammatory reactions, leading as they inevitably do to further fibrosis. Certainly, prevention of this gross fixation is imperative and explains the urgency of active therapy in the earliest stages of these diseases of attrition.

The possible significance of reflex vasomotor disturbances resulting in vascular stasis and œdema is difficult to evaluate but it is probable that in an appreciable proportion of cases this factor cannot be overlooked, particularly in those who develop this extensive limitation of function. Local blocking of the cervical autonomic nerve supply is warranted on this basis in these cases, but its effectiveness must await the report of further trials.

CASE REPORT

Male, age 61, struck on October 10, by mudguard of truck over outer aspect of right arm above elbow. No immediate pain. During day, shoulder became stiff and painful on movement. Pain referred to anterior deltoid region. Well localized tenderness at anterior deltoid prominence with soft tissue swelling at this site. No crepitus. Any movement of shoulder, particularly abduction, produced severe pain but it was possible with care to abduct the shoulder beyond 90 degrees especially if the humerus was in a position of external rotation. No weakness of the supraspinatus or other components of the rotator cuff musculature, although pain on attempting abduction against resistance with humerus in a position of 20 degrees abduction. No neurological changes in the upper limb. No neck pain, stiffness, or muscle spasm. Radiographs of the shoulder region showed no skeletal deformity or any periarticular calcification. TREATMENT.—Diathermy and massage with continuation of active exercises in prescribed programme.

October 18.—Abduction possible to 50 degrees before acute pain produced. Local tenderness at anterior deltoid prominence subsiding. Major complaint of pain now referred to deltoid insertion where there is also mild local tenderness.

November 1.—Able to complete guarded circumduction of shoulder. Minor local tenderness at anterior deltoid prominence persists.

November 12.—Returned to work. Aggravation of pain at outer aspect of upper arm in its lower half.

December 6.—Strenuous activity in job as street cleaner produces pain in anterior deltoid region with occasional radiation of pain down outer aspect of arm as far as the upper forearm. Aching at end of day severe enough to keep him awake at night. Only tenderness now just medial to anterior deltoid prominence. Full range of all shoulder movement, with actual pain only on abduction in range between 80 and 110 degrees.

January 11.—Now three months since original injury. Continuing work but with increasing disability. For two weeks had noticed painful crepitus within shoulder joint with movements entailing flexion, abduction and external rotation of the arm. Initial subjective sensation of "clicking" has become more prominent and now an audible sound is produced. Specifically occurs when arm brought into forward flexion, usually when associated with abduction and external rotation, although occasionally noted by the patient with internal rotation. Develops increasing discomfort as movement is forced with subjective sensation of resistance until sudden painful "snap" allows relief of pain and resistance whereupon movement may be continued unimpeded and in a painless manner. Palpable movement detected at time of "snap" just lateral to anterior margin of deltoid slightly below major shoulder prominence. Definite localized tenderness in same area lateral to coracoid process. Some slight swelling or thickening can be detected under the medial margin of the deltoid muscle in this area. On examination "snap" could be reproduced by passive movement of humerus into a position of abduction and external rotation. No neurological changes in arm. Also has pain on supinating forearm against resistance, as in turning doorknob or using a screwdriver.

January 15.—*Operation performed:* Henry approach. On abduction and external rotation of the humerus the tendon of the long head of the biceps muscle almost immediately slipped out of the intertubercular groove, dislocating medially anterior to the lesser tuberosity for a distance of approximately one inch. The dislocating tendon was covered by a fibrinous exudate although little residual evidence of an inflammatory reaction was apparent in the bicipital groove once the tendon had dislocated. Transverse ligament was completely torn so that no real roof remained over the groove. The intracapsular portion of the tendon was excised completely and the distal end sutured securely to the freshened floor of the groove.

August 13.—No residual complaints referable to shoulder. Working at previous job without any loss of time or any subjective disability. Shoulder joint movement complete and painless in all directions with normal muscle power. No pain on supination of forearm against resistance. The only evidence detected to indicate division of the tendon concerned the clinical demonstration of slight relaxation of the biceps muscle without impairment of power or function.

COMMENTS

This case demonstrates the co-existence of these two conditions in a single joint. The initial symptomatology and early findings pointed to the rotator cuff as the source of the clinical picture, but the eventual complaints implicated the

biceps tendon and the ligamentous supports around the bicipital groove which proved to be involved more seriously by the degenerative process. The early results of surgical treatment suggest that permanent limitation of scapulo-humeral movement has been prevented and that the degree of involvement of periarticular structures such as the musculotendinous cuff was minimal, thus allowing recovery of a full range of painless movement.

SUMMARY

1. A brief summary of the pathogenesis, clinical picture and treatment of degenerative soft tissue disease at the shoulder joint has been presented.

2. The pathological processes responsible for the production of symptoms are outlined in a diagram, and the usual means of clinical differentiation summarized in tabular fashion.

3. An illustrative case report with operative verification of the diagnosis is included.

4. The need is stressed for early recognition of these diseases of attrition so that an active regimen of therapy can be instituted with a view to reversal of the phenomena which can produce, if not arrested, permanent limitation of scapulo-humeral movement.

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Case Reports

A CASE OF ACQUIRED HÆMOLYTIC ANÆMIA WITH FEATURES RESEMBLING LUPUS ERYTHEMATOSUS*

LIONEL GORDON, M.D. and
LOUIS LOWENSTEIN, M.D., *Montreal*

ACQUIRED HÆMOLYTIC ANÆMIA may result from accelerated destruction of erythrocytes caused by various factors. Some of these are considered to be extrinsic and include reactions to coal tar derivatives, lead compounds, transfusions, drugs, animal poisons, and virus and bacterial infections. Often, however, the hæmolysis is associated with the production of iso-antibodies or auto-antibodies which are best demonstrated by the use of the Coombs test, and in these types the actual cause may be less clearly understood.

The principle of the Coombs test is the agglutination of red cells, to the surfaces of which globulin is adsorbed, by an anti-human anti-globulin serum (Coombs serum). It has been suggested by Baikie[1] that the adsorbed globulin may render the red cells auto-antigenic, thereby resulting in the production of auto-antibodies and hæmolysis. Evans *et al.*[2] suggested a disordered immune response as a common etiology for both acquired hæmolytic anæmia and primary thrombocytopenic purpura, because in the latter a positive Coombs test was also frequently found.

The purpose of this paper is to report a case of a severe hæmolytic anæmia with antibody formation, associated with numerous features resembling disseminated lupus erythematosus, and the effective sustained remission which followed prolonged cortisone therapy. Dubois[3] described three cases of acquired hæmolytic anæmia with positive direct Coombs tests. All three subsequently developed the clinical features of lupus erythematosus. Though he suggested hypersplenism as the cause of the hæmolytic process, two of these patients failed to respond to splenectomy. Two were given adrenocorticotropin with good results, and in one of these L.E. cells could no longer be demonstrated after therapy.

Berman *et al.*[4] cited a case of lupus erythematosus in a 37-year-old woman with hæmolytic anæmia. Splenectomy resulted in cessation of the hæmolytic process but the lupus was unaffected. Lee *et al.*[5] mention a case of acquired hæmolytic anæmia in which L.E. cells were found in the bone marrow, although the excised

*From the Departments of Medicine of the Jewish General Hospital and the Royal Victoria Hospital, Montreal.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

spleen did not show pathological changes characteristic of L.E.

Other cytopenias in lupus erythematosus, such as leukopenia and thrombocytopenia, are frequently noted. The frequent finding of a positive direct Coombs test in lupus erythematosus raises the question of a possible relationship between the red cell adsorbed globulin and these hæmatopenias.

CASE REPORT

The patient is a 44-year-old white Canadian housewife, first seen on April 17, 1952, with complaints of exertional dyspnœa, weakness, palpitation, pains in the hands, wrists, elbows, and shoulders, and frequent colds, of four months' duration.

She stated that her mother had died in her forties of asthma, and that her maternal grandfather had had an anæmia of unknown etiology and severity and had died at the age of 78. Otherwise the family history was negative.

The functional inquiry was essentially negative and her history revealed no illness other than measles and mumps in childhood. Three years previously her blood Wassermann reaction had been reported positive. Her husband's serological tests were negative; she and her husband asserted that she was a virgin at the time of her marriage and both denied extramarital relations. Nevertheless, a course of penicillin had been administered. She had been married for 21 years, had had one miscarriage at the fifth month, and 19 years ago was delivered of a healthy male child. The remainder of the past history was irrelevant.

The outstanding physical findings were extreme pallor and obvious dyspnœa at rest. She was moderately well nourished and developed. Oral temperature was 100.2° F. Blood pressure was 140/90. The palate, nail beds and conjunctivæ were pale. Both optic disc margins were blurred. A number of small frank retinal hæmorrhages were seen along the course of some of the vessels and there were small patches of yellowish-white exudate, probably representing absorbing hæmorrhages. The scleræ were subicteric. No rash was present. Flexion deformities of the proximal interphalangeal joints of both little fingers were noted. A precordial blowing systolic murmur was heard, which was loudest at the pulmonic area. The spleen was just palpable.

Routine blood count showed a hæmoglobin value of 3.9 gm. %, red cell count of 1,360,000, and white cell count of 5,000. The red cells showed well-marked macrocytosis, anisocytosis and poikilocytosis. The differential white cell count showed 63% neutrophils, including numerous stabs, 35% lymphocytes, 1% monocytes and 1% eosinophils.

Urine was of specific gravity 1.015, with 4 to 5 red cells per high-power field and an occasional hyaline cast. Chest radiography was negative. The blood Wassermann reaction was positive and the Kahn reaction doubtful. On repeat examination, both Wassermann and Kline tests were positive.

Further hæmatological investigation showed a sedimentation rate of 69 mm. in one hour, corrected 15 mm. per hr. (Wintrobe), increased fragility to hypotonicity with hæmolysis beginning at 0.6% NaCl and complete at 0.4% NaCl, a reticulocytosis of 41%, a number of spherocytes in the blood smears and a platelet count of 240,000. The serum was slightly icteric.

Bone marrow aspiration biopsy showed marked normoblastic erythropoietic tissue, and some increase of reticulum cells and of the phagocytic activity of these cells. The findings were consistent with a very severe acute hæmolytic process. The direct Coombs test was strongly positive. The L.E. test* was definitely positive both for characteristic L.E. cells and for leukocyte rosette formation around extracellular L.E. material (Fig. 1).

She was admitted to the Jewish General Hospital, Montreal, on April 22, 1952, with a provisional diagnosis of acute hæmolytic anæmia. The physical findings on admission were as previously described.

The urinary sediment contained 2 to 3 red cells and 2 to 3 white cells per high-power field. No casts were seen. The Mosenthal test was normal. Urine urobilinogen was normal. The blood chemistry was reported as follows: fasting sugar level 81 mgm. %, NPN 21.5 mgm. %, albumin 4.61 gm. %, globulin 1.86 gm. %, serum bilirubin (direct) 0.6 mgm. % and (indirect) 1.48 mgm. %.

Auto-agglutinins were found in a titre of 1:2 at room temperature and 1:4 at ice-box temperature. An electrocardiogram showed low voltages in the limb leads. Her chest radiograph was again normal. The retinal hæmorrhages and exudates previously described were again noted. The temporal disc margins were not very clear.

Following a transfusion of 500 c.c. of blood, the red cell count rose to 1,600,000 and the hæmoglobin value to 5.6 gm. % (Fig. 2). The colour index was 1.1, white cell count 3,800. The fragility to hypotonicity was still increased, hæmolysis beginning in 0.56% NaCl solution and complete in 0.4% NaCl. There was a reticulocytosis of 25.5% as well as macrocytosis, polychromatophilia and basophilia. Spherocytes and nucleated red cells were present. A shift to the left in the neutrophils and a few myelocytes and metamyelocytes were noted.

She received a second transfusion of 500 c.c. as a result of which the hæmoglobin value rose slightly to 6.0 gm. %. Subsequently she was placed on oral cortisone therapy; for the first three days she received 200 mgm. daily in divided doses, after which time the daily dose was gradually decreased to 100 mgm. After a week of low-grade fever, the temperature returned to normal. The red cell count, hæmoglobin value and white cell count rose and there was a reciprocal fall in reticulocyte count. Nucleated red cells disappeared from the circulation and the saline fragility returned to normal. When discharged from hospital two weeks after starting cortisone, she was asymptomatic. Her red cell count had risen to 3,130,000, hæmoglobin value to 9.8 gm. %, and white cell count to 5,000, and the reticulocyte count had fallen to 4.6%. The serum bilirubin (direct) was 0.06 mgm. % and (indirect) 0.55 mgm. %. She was able to resume her household duties immediately.

After her discharge from hospital in May 1952, the patient continued to receive cortisone. The hæmatological findings steadily improved. The retinal hæmorrhages, splenomegaly and the systolic murmur disappeared. In June 1952 her hæmoglobin value had risen to 13.1 gm. % and her red cell count to 4,250,000; the reticulocyte count had dropped to 2.2%.

Œdema and rapid weight gain were controlled by salt restriction and administration of oral mercurial diuretic chlormerodrin (Neomerin). At times potassium chloride was given orally. No serious ill effects as a result of therapy were encountered. Hæmatological studies were performed one to four times monthly. The average daily requirement of cortisone was 37.5 mgm. Two attempts were made to discontinue the cortisone gradually but were followed by mild relapse of the hæmolytic process. In one of these trials, after gradual reduction of cortisone

*The method used was as follows: A suspension of leukocytes was prepared from the heparinized blood (0.2 mgm. per 10 c.c. blood) of a normal individual by drawing off the plasma after the red cells had partially settled, then centrifuging the plasma for five minutes at 1,000 r.p.m. and discarding the supernatant. To the leukocytes packed in the bottom of the centrifuge tube was added 0.5 c.c. of heparinized plasma from the patient. After resuspension of the cells and incubation in a water bath at 37° C. for 30 minutes, the mixture was centrifuged for five minutes at 1,000 r.p.m. The plasma was discarded and smears of the packed leukocytes were made, stained with Jenner-Giemsa and examined.

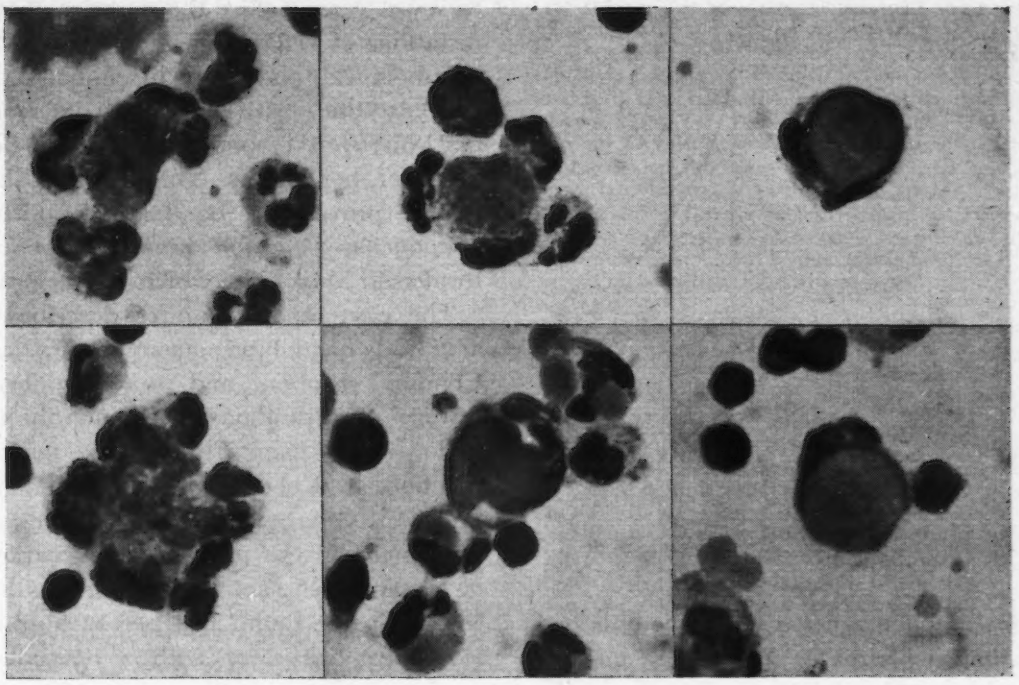

Fig. 1.—Photomicrographs of positive L.E. test obtained during hæmolytic crisis showing rosette formation of leukocytes around extracellular L.E. material and showing also typical L.E. cells.

dosage to zero in January 1953, the hæmoglobin value fell to 11.0 gm. %, and the red cell count to 3,720,000, while the reticulocyte count rose to 3.2%. Cortisone at the rate of 50 mgm. per day was again started and the blood picture promptly improved as anticipated. She was maintained almost continuously on cortisone for two years until May 17, 1954, when, following a period of gradual reduction in dosage, this therapy was finally terminated. At this time her hæmoglobin value was 14.0 gm. %, reticulocyte count 2%, and red cell count 4,500,000.

For the past eight months there has been no relapse of her hæmolytic process and she has remained perfectly well. Repeated further attempts have failed to demonstrate L.E. cells, although the direct Coombs test is still positive.

COMMENT

When the mild relapse of the hæmolytic process occurred after withdrawal of cortisone in January 1953, splenectomy and irradiation of the spleen were considered, but were rejected for the following reasons: (1) These forms of therapy have not always proved successful in the autoimmune type of acquired hæmolytic anæmia. (2) Cortisone is known to benefit many of these cases. (3) A diagnosis of lupus erythematosus could not be excluded.

Splenectomy has been shown to improve hæmolytic anæmia occurring in lupus erythematosus but has no effect upon the course of the underlying lupus erythematosus.[6] The excellent clinico-hæmatological response to relatively small maintenance dosage of cortisone and the absence of significant undesirable side-effects of this drug justified its long-term continuation.

In the eight months which have passed since discontinuing cortisone, no clinical or hæmatological relapse of the anæmia has occurred. The persistently positive direct Coombs test, the presence of a slight reticulocytosis on several occasions and the failure of microcytic spheroidocytes to disappear suggest, however, that, although well compensated, a hæmolytic component is still present. Consequently the patient was transfused with 500 c.c. of normal red cells and the life span of these normal cells was determined by a modification of the differential agglutination method of Ashby.[7, 8] The survival time of these cells in the patient's circulation was approximately half the normal, and the curve obtained was typical of a hæmolytic process (Fig. 3). This study gave supporting evidence for the continuing existence of excessive red cell destruction and also indicated that the responsible factor is contained in the patient's plasma.

It has been established by immunological and biochemical methods that the L.E. factor is specific and is associated with the gamma globulin fraction of plasma.[9, 10] The incubation of plasma or serum containing this factor with blood or bone marrow leukocytes from the patient, from a normal person or from a healthy dog will induce a positive L.E. test.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

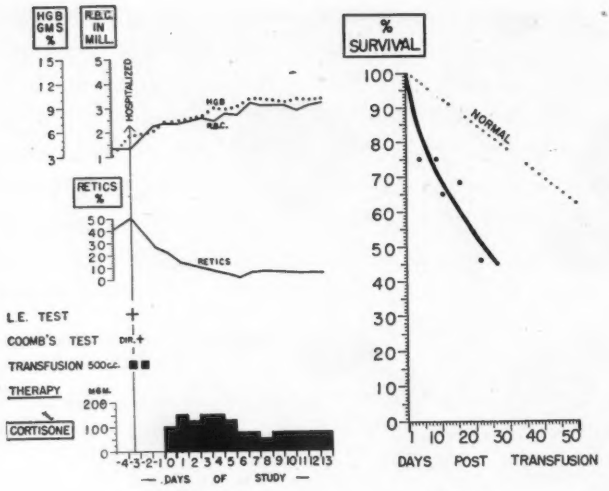

Fig. 2

Fig. 3

Fig. 2.—Effect of transfusions and cortisone on patient's blood findings. **Fig. 3.**—The solid dark line represents the patient's survival curve.

Occasionally when a negative test is obtained with heparinized plasma, a positive test may be obtained with non-heparinized serum from the same patient.[11] This could be due to increased sensitivity of the serum or to a false positive reaction. The single positive L.E. test obtained was performed with heparinized plasma from the patient according to the method described. In over 700 tests performed with this method by one of us (L.L.) no false positive reactions were obtained.

The repeated unsuccessful attempts to demonstrate L.E. cells following the acute hæmolytic crisis were made with mixtures of the patient's heparinized plasma and blood or bone marrow leukocytes, as well as mixtures of the patient's serum with her own leukocytes and with normal leukocytes.

The finding of false positive serological tests for syphilis has occasionally been reported as a transient phenomenon in association with acquired hæmolytic anæmia. The cases by Rubinstein[12] and Lubinski and Goldbloom[13] were the only recorded ones we have been able to find in the literature. In Rubinstein's case the Wassermann reaction became negative after splenectomy. The case described by Lubinski and Goldbloom was that of an 11-year-old boy whose illness was rapidly progressive and fatal.

False positive biological reactions are frequently reported in lupus erythematosus. It is interesting to note that this finding may precede the disease by a long time. Haserick and Long[14] reported five cases in which false positive serological tests for syphilis were observed from one to seven years before the onset of clinical manifestations of L.E., suggesting that there may be a subclinical phase of disseminated lupus. In this case the positive Wassermann reaction was first discovered some three years before the onset of her illness. This serological test was finally proved to be falsely positive by a *Treponema pallidum* immobilization test performed in May 1954, which was negative.

The case reported above describes an acute acquired hæmolytic anæmia with a positive Coombs reaction and auto-agglutinins. The history of arthralgia, fever, rapidly increasing pallor, retinal hæmorrhages, false positive serum reactions, red cells and casts in the urine, low limb-lead voltages in the electrocardiogram, and leukopenia in the presence of a marked degree of erythropoietic activity, together with the positive L.E. test found just before hospitalization, is wholly consistent with a diagnosis of disseminated lupus erythematosus. The sustained relative remission for eight months following discontinuance of cortisone and the failures to repeat the demonstration of L.E. cells do not necessarily exclude this diagnosis.

SUMMARY

1. A case of acute acquired hæmolytic anæmia with antibody formation and with numerous features resembling disseminated lupus erythematosus is described.

2. After treatment with cortisone for two years, withdrawal of the drug has been attended by clinico-hæmatological remission for eight months, although a well-compensated hæmolytic process still persists.

3. The course of this patient's illness would support the suggestion that a subclinical phase of lupus erythematosus of varying degree may exist for a long time. The L.E. test should be performed in any acquired hæmolytic anæmia with a positive Coombs test and false positive serum reactions for syphilis.

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BENIGN STRICTURE OF THE INTESTINE*

LUKE TESKEY, JR., M.D.,† *Toronto*

BENIGN FIBROUS STRICTURE of the bowel following an episode of strangulation first appeared in the literature in 1784. In 1892, Garré of Germany reviewed previous literature and coined the term "intestinal stenosis." This condition has therefore been referred to subsequently as the "benign stenosis of Garré."

The first cases reported were observed to follow reduction of strangulated hernias by taxis, but today, with operative reduction, this complication still occurs. Intussusception has been reported as a cause by Tanner and Bratton.[2] The precipitating cause appears to be strangulation of the bowel. The condition is probably due either to vasospasm or to vaso-insufficiency within the strangulated loop, with resulting ischæmia. Although not sufficient to devitalize the bowel completely and permit perforation, this ischæmia is sufficient to cause marked fibrosis and later stricture, a process not unlike Volkmann's contracture in a limb.

When seen in the late stage, there is a small segment of bowel which is contracted but possesses a very thick wall. The lumen of the bowel is greatly narrowed or even occluded. The pathological picture is one of fibrosis of all the layers of the bowel wall.

Many previous articles have drawn attention to the occurrence of diarrhœa, or the passage of blood in the early postoperative period. Neither of these observations were made in the two cases reported herein.

CASE 1

Mrs. A.E., age 62, was first seen at the Toronto East General Hospital on July 14, 1950, at which time she was suffering from strangulation of a right femoral hernia of 12 hours' duration. At operation the sac was found to contain blood-tinged fluid; the bowel was black but the serosa glistened. Thirty-five minutes were spent in applying hot packs, and during this time a slow but steady return of colour was noticed. The bowel was thought to be viable, and was returned to the abdomen. Wangensteen suction was maintained for three days after operation, being discontinued on passage of flatus. The postoperative course subsequently was slow because of considerable gas collection and intermittent distension in the presence of active peristalsis and the passage of flatus. The patient was discharged on the 19th postoperative day.

Mrs. A.E. was readmitted on October 1, 1950, because of intermittent bouts of pain and constipation. The picture at this time was one of subacute obstruction. Treatment was expectant: the patient promptly improved and was discharged on October 9, free of discomfort.

She was again admitted on December 13, 1950, showing signs of intestinal obstruction, the interval having been marked by many attacks of pain and constipation. At operation on December 14, a dense scarred area was noted in the terminal ileum. This portion of bowel had the consistency of cartilage. The proximal bowel was dilated; that below the lesion was collapsed. A side-to-side ileo-ileostomy was performed. The postoperative period was marred by pulmonary embolism, treated with heparin. The patient survived and has not had further trouble.

CASE 2

Mrs. L.H., aged 53, was first seen at the Toronto East General Hospital on January 10, 1954, because of a strangulated hernia of 13 hours' duration. At operation, the sac was noted to contain blood-tinged fluid. The bowel surface was shiny, and dark red to black in colour. After 15 minutes, peristalsis crossed the loop, and the colour was again normal. The bowel was returned to the abdomen. The postoperative course was uneventful and the patient was discharged on January 17.

She was readmitted on April 10, because of recurrent vomiting and abdominal pains. These symptoms started two weeks after discharge, and slowly increased in frequency and intensity. At laparotomy, on April 11, a narrowed fibrous ring 4 cm. in width was found, 2½ ft. (75 cm.) from the ileocæcal valve. This ring was very hard, and on palpation there did not appear to be any lumen present. The proximal bowel was distended and the distal bowel was collapsed. A side-to-side ileo-ileostomy was performed. The postoperative course was uneventful and the patient was discharged on April 22. Follow-up as an out-patient revealed no further complaints.

COMMENT

These patients present the same basic pathology, strangulated femoral hernia of approximately 12 hours' duration. In the first case, the colour was slow to return; in the second, it was prompt and peristalsis crossed the involved segment. Both patients presented symptoms of stenosis early after operation and both required hospitalization approximately three months after reduction of strangulation. Both cases were treated by side-to-side ileo-ileostomy. The possibility that adhesions may cause the same picture must not be overlooked. However, in neither case were any adhesions of significance found at operation.

*From the Toronto East General Hospital.
†Surgical Staff, Toronto Northwestern General Hospital.

It is doubtful whether the occurrence of this stenosis can be foretold at the time of the original strangulation. Thus prophylactic resection at this stage is not advocated.

SUMMARY

1. Benign stricture of the intestine, an uncommon but always possible complication of intestinal strangulation, is discussed.

2. The pathology is likened to that of Volkmann's contracture; the condition appears to be due to ischæmia and subsequent fibrosis.

3. It is recognized by the signs of subacute or acute small bowel obstruction.

4. When symptoms of acute obstruction arise, the treatment advised is side-to-side ileo-ileostomy without resection.

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ADENOCARCINOMA OF THE SMALL BOWEL

J. D. McINNES, M.D., F.I.C.S.,*
Sudbury, Ont.

IN NOVEMBER 1954, I was called in consultation to see Mr. S.J., aged 65, who had a history of epigastric distress dating back some 25 years. His presenting complaint was inability to eat because of resulting crampy abdominal pain. He was nauseated some of the time and vomited occasionally. He also complained of general weakness and shortness of breath, which had been increasing rather rapidly over the past few months. At one time he had a gastrointestinal series and an acid test meal done at a Toronto hospital, and apparently nothing was found at that time.

About two years previously, his appetite began to fail somewhat and he had burning in the epigastrium which was aggravated by food but relieved by milk. Also two years ago, his constant constipation appeared to become worse and he had difficulty moving his bowels. Apparently, he had been in this hospital from March 6 to 9, 1954, with a diagnosis of unexplained anæmia and had received blood transfusions which gave him a temporary elevation of hæmoglobin value. However, after discharge his blood hæmoglobin rapidly returned to a low level and he was readmitted from April 12 to 15. A search was again made for blood loss and apparently none found. At that time his hæmoglobin value was in the neighbourhood of 50%. At the time of admission it was suspected that this man had some hidden bleeding or some blood dyscrasia, although no evidence was found to support this. The patient had noticed a movable lump in his left lower abdomen for several months, and he thought that it had increased in size in the past few months.

He was a rather sallow, elderly man in poor nutrition. He had some increased pigmentation of his elbows and other areas, but it did not appear to be any more than his normally rather dark and somewhat sallow colour. His head, neck and chest were normal; there was no evidence of glandular enlargement in the supraclavicular triangle or elsewhere. The heart and lungs appeared to be normal. The abdomen was flat and soft; the wall appeared to be, like other tissue, under a general degradation process, probably malnutrition. There was a hard, smooth, crescentic mass about two inches (5 cm.) long in his left lower quadrant, which could be moved across to the right side or back into the left paracolic gutter. This mass had great mobility. On heavy pressure against the bones, it did not pit or indent, and was tender only under heavy pressure. Rectal examination revealed a prostate somewhat enlarged, more particularly in the left lobe, but spongy and not suggestive of malignancy.

Laboratory investigation including radiography showed nothing striking other than the marked hypochromic microcytic anæmia. Gastrointestinal series and acid test meal results were within normal limits. The differential count was also normal. The blood smear revealed a rather characteristic picture of a hypochromic microcytic anæmia. The hæmoglobin value on November 16 was 44%; the sedimentation rate was normal and the urine normal. Repeated tests for occult blood in the stool were negative.

My impression of this man was that his anæmia was more likely to be due to nutritional difficulties, as he had lived on milk alone for the past few years because everything else appeared to bother him. It was also my opinion that the smooth, non-tender, very mobile mass in his abdomen had something to do with his inability to eat and digest food. A bone marrow examination was considered but not done.

The patient was prepared for operation by the infusion of 3,000 c.c. of blood and when his condition was considered reasonably satisfactory he was operated upon on November 23, 1954,

*Chief of the Surgical Services, St. Joseph's Hospital, Sudbury, Ont.

through a left lower rectus incision. Upon opening the abdomen, one was struck immediately by the presence of a hard, irregular, localized, freely movable mass situated in the ileum about 18 inches proximal to the ileo-cæcal valve. This mass, obviously in the small bowel, could be delivered with ease through the abdominal wound. There was no inflammatory change surrounding the mass and there were no enlarged lymph nodes in the mesentery, nor was there any evidence of extension of tumour in the form of local spread, spread by contiguity or metastasis to liver or peritoneum. About 12 inches of bowel including the tumour was resected along with a wedge-shaped portion of the mesentery, and the intestine united by end-to-end anastomosis. The postoperative course was smooth and uneventful and he was discharged in good condition. The pain was relieved and he was able to eat once more without continuous discomfort.

Since operation, this man has steadily gained weight and he now appears able to maintain his blood hæmoglobin at a satisfactory level.

PATHOLOGY REPORT

Gross.—The specimen was 17 cm. in length and 2.8 cm. in diameter and twisted on itself at the midpoint. At this point the mucosa was replaced by a partially pedunculated, granulated pale tumour with a granular pale cut surface, and the bowel wall was 1.4 cm. in thickness. Examination of the attached fat disclosed three lymph nodes with pale granular cut surfaces; the largest was 0.8 cm. in diameter.

Microscopic.—Sections of the small intestine revealed malignant change in the expanded portion. It involved the mucosa and extended through the wall into the adjacent fibro-fatty tissue. The atypical epithelial cells had basophilic cytoplasm and hyperchromatic nuclei. The cells formed pseudogland acini. The picture suggested a carcinoma arising in a diverticulum. In the lymph nodes there was some œdema, mild fibrosis and occasional areas of reticulo-endothelial cell hyperplasia. Lymphocytes were present in the sinuses. No secondary tumour was found.

Pathological diagnosis.—Adenocarcinoma in the small intestine, possibly arising in a diverticulum, and chronic lymphadenitis.

SUMMARY

This, then, is the case of a man who had epigastric distress for some 25 years without showing any definite clinical evidence of a lesion. In the past three years, he has had continuous crampy abdominal pain, shortness of breath, paleness, and continued ill health. He had been hospitalized at least three times. Each time investigation did not reveal any loss of blood or source of anæmia. Even though transfusions had been given at these times he was unable to maintain his blood level for any length of time. At the last admission, a freely movable mass in his left lower abdomen was removed. The mass had been almost entirely blocking his small bowel at a point 18 inches from the ileo-cæcal valve. This, we feel, was producing almost complete obstruction although clinically obstruction was not suggested. However, we felt that his anæmia was secondary to malnutrition. The malnutrition was due, of course, to lack of ability to eat because of continuous colicky abdominal pain.

It is my impression that, even though this tumour had undoubtedly been there for a few years, the outlook should be excellent, despite the diagnosis of adenocarcinoma, as the tumour was entirely localized, and freely movable, and showed no evidence of local or widespread metastases. This adenocarcinoma in the small bowel may have arisen from a Meckel's diverticulum. This possibility is suggested by the location of the tumour (18 inches from the ileo-cæcal valve) but no evidence of a diverticulum could be seen in either the specimen or microscopic sections.

BOXING INJURY: RUPTURE OF SPLEEN IN INFECTIOUS MONONUCLEOSIS*

BREEN MARIEN, M.D., M.Sc., F.R.C.S.[C.],
PHILIP CULLEN, M.D. and
R. C. LONG, M.D., B.Sc., F.R.C.S.[C.],
Montreal

IT IS WELL RECOGNIZED that the enlarged spleen found in infectious mononucleosis is prone to spontaneous rupture. Smith and Custer[1] reported clinical and pathological findings in seven instances of apparent spontaneous rupture of the spleen in this disease. However, there has often been some trivial injury associated with the event. Among reports of boxing injuries, none could be found describing rupture of the spleen.

*From the Department of Surgery, Royal Victoria Hospital, Montreal.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

Mr. M.F., age 20, a member of a university boxing team, one week before an intercollegiate contest developed an upper respiratory infection characterized by sore throat, fever, and muscular pain. He consulted his local physician and chloramphenicol was prescribed.

On the day of the contest, he felt much improved and attended the weighing-in medical examination. The bout consisted of three rounds. In the second round he felt unduly weak. He was assisted to the dressing room after the third round. For the next three hours he complained of intermittent vomiting and profound weakness, but no undue abdominal pain. He was seen by a team physician and referred to hospital.

On admission to hospital the blood pressure was 110/60. The abdominal wall was rigid but not distended. The pharynx was reddened. Fine inspiratory rales were heard at the left base. Enlarged cervical and axillary glands were noted. The hæmoglobin value on admission was 60%, the hæmatocrit 3%, and the white cell count 7,000 with an absolute lymphocytosis of 70%. Abnormally large lymphocytes were seen.

A diagnosis of infectious mononucleosis was entertained, with the added possibility of ruptured spleen. A surgical consultation was obtained. Abdominal paracentesis in the left upper quadrant revealed dark, unclotted blood. A radiograph of the abdomen demonstrated an enlarged splenic shadow. A clinical diagnosis of ruptured spleen was made, blood transfusions were given and the patient was operated upon 12 hours after the injury. At operation an enlarged spleen was found, weighing 490 gm. and having several large rents in the capsule and one rent which extended into the hilus, almost dividing the organ into two parts. The peritoneal cavity contained 2,500 c.c. of bloody fluid. The spleen was easily removed.

Postoperatively, the Paul Bunnell reaction was strongly positive in high dilution, confirming the diagnosis of infectious mononucleosis. The patient made an uneventful recovery and was discharged in 3 weeks.

Pathological examination of the enlarged spleen revealed mononuclear cell infiltration of the capsule and the trabeculæ. The pulp was increased in bulk and very hæmorrhagic.

It is our impression that rupture of the spleen incurred during a boxing bout is a rare form of injury. It is well known that trivial injury may precipitate rupture of a pathological spleen.

It is apparent that a more careful medical examination before the contest might have revealed the enlarged spleen and the consequent danger to the man in allowing him to enter the ring. The value of diagnostic paracentesis is well illustrated in this situation.

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PROTEINS ARE SATISFYING

It has been suggested frequently in the past that appetite is closely associated with either blood glucose level or "available" blood glucose level as measured by arteriovenous glucose difference, or delta glucose level. Fryer and his colleagues (*J. Lab. & Clin. Med.*, 45: 684, 1955) now produce evidence from a study of reducing diets for overweight persons that the protein component of a diet is more important than either fat or carbohydrate in satisfying appetite. Several of the subjects studied complained of constant hunger when on a low protein diet, and were satisfied with a high protein diet, even when blood glucose levels were low.

Clinical and Laboratory Notes

THE USE OF BANTHINE IN PRIMARY DYSMENORRHŒA

S. MALKIN, B.Sc., M.D., *Winnipeg, Man.*

BANTHINE (methantheline), a quaternary ammonium compound, has been known for some time to be useful in the alleviation of visceral pain. As an anticholinergic drug it has been used with varying success and is of value in the treatment of peptic ulcer,[3] biliary colic,[4] acute pancreatitis,[5] ureteral colic,[6] and bladder spasm.[7] It follows logically that Banthine might be of use in diminishing pain of uterine origin, viz. in primary dysmenorrhea. A search of the literature to this date failed to reveal the use of Banthine in this condition.

Primary dysmenorrhœa[2] varies from a mild general malaise and abdominal discomfort to a severe malaise and abdominal pain incapacitating the individual for several days each month. There is no evidence of a pelvic lesion on physical examination. Symptoms include abdominal cramps, nausea and vomiting, diarrhœa, abdominal distension, tenderness and pain in the breasts, irritability, restlessness, depression and premenstrual tension.

Banthine as used in the succeeding three cases was found to be highly successful in the alleviation of symptoms.

CASE 1

F.S., age 14; menarche at age 12. Her menses were at first painless and symptomless. Six months later dysmenorrhœa began, with abdominal pain and gastrointestinal symptoms which became more and more severe with each menses. There was a constant midline pain accompanied by severe cramps at varying intervals, and by nausea and vomiting which became more and more persistent, until she was almost helpless and near collapse. These severe symptoms continued for ten hours, then gradually diminished and subsided. By age 13 her dysmenorrhœa had become so severe that she was completely incapacitated and confined to bed for the first day of flow. The day of her menses was approached each month with fear.

Physical examination was essentially negative. Digital rectal examination revealed a small tender anteverted uterus; ovaries were non-palpable.

In November 1953 she was started on 50 mgm. Banthine orally 3 times a day, beginning an estimated three days before the period and continuing for the first day of flow. She had immediate and complete relief of gastrointestinal symptoms. The abdominal pain became mild and was controlled by aspirin. She was now able to go to school during every day of her menses. In March 1954, she forgot her Banthine and had a complete return of all her symptoms. By August 1954 menses had become irregular, with intervals varying from 14-25 days, and she discontinued the medication. There has been no return of symptoms to this date.

CASE 2

L.D., a nurse, age 25; menarche at age 13. Dysmenorrhœa had begun at about 15; it was at first mild but for some years had become a severe lower abdominal aching with superimposed cramps often severe enough to confine her to bed. She had premenstrual abdominal bloating and pain in the breasts, usually worse the day before the flow. There was some nausea and severe headache on the day of flow. She had used various sedatives and analgesics, such as phenobarbital and Midol, but these only dulled her perceptions; she still had symptoms and was unable to work.

In June 1954, she was started on Banthine, 25 mgm. 3 times a day p.c. for two days premenstrually and on the first day of flow. This was continued for July, August, and September 1954. She had no gastrointestinal symptoms, no irritability, and no abdominal pain in any of these six months from June-November 1954, inclusive. There was improvement in the abdominal bloating, but no change in breast pain or headache. She felt no different before or during the menses than during the rest of the month. Banthine removed most of her symptoms, though she had pelvic discomfort for one day premenstrually. Menses became irregular, varying from 21-30 days, and Banthine was discontinued in October 1954. There has been no return of severe symptoms to this date.

CASE 3

P.M., age 18; menarche at age 13. Dysmenorrhœa began about a year later with complete loss of appetite, nausea and vomiting on one or two occasions for two days, pelvic discomfort for one day premenstrually, cramps so severe she had to lie down on the first day of the flow, headache, and sore breasts.

She started taking 50 mgm. of Banthine 3 times a day in October 1954 for three days before the day of the flow. In October and November 1954 she had only slight abdominal pain during the days of the flow, and sore breasts. Banthine was not taken in December and she had a complete return of symptoms. Banthine was again taken in January 1955, and except for abdominal bloating and sore breasts for one day premenstrually, and slight lower abdominal aching, she had complete relief of symptoms. Banthine medication is still being continued.

DISCUSSION

Some authors believe that all the complaints of dysmenorrhœa have a psychological cause, while others believe that dysmenorrhœa is a somatic disorder with a psychogenic element superimposed. Yet many women who complain of cramps show no psychoneurotic tendencies in other situations, no matter how great the stress. While most women look on their cramps as something normal and to be endured, the women with incapacitating dysmenorrhœa are unable to face the difficult days without apprehension. There is probably, during these days, a lowered threshold of pain; but there is also an exciting cause.

The uterus is supplied by both sympathetic and parasympathetic fibres which coalesce in the area between the junction of cervix and vagina and the uterosacral ligaments to form Frankenhauser's plexus. The bearing-down pain and pelvic discomfort accompanied by nausea and vomiting is now attributed to spasm of terminal arterioles in the endometrium. An overactive sympathetic system may operate to produce a vasoconstriction; contraction of the uterus in the presence of ischæmic endometrium or myometrium produces pain.

The endocrines also play a part in primary dysmenorrhœa, for œstrin is a vasodilator and progestin a vasoconstrictor. It is possible that progesterone nullifies the action of œstrin and prolongs the vasoconstriction. These effects are not mediated through the nervous system, for they are noted experimentally in a transplanted uterus devoid of nerve supply. Banthine acts as a ganglion blocking agent on both the sympathetic and parasympathetic autonomic nervous systems, and it also exerts a potent additive atropine-like action at the postganglionic nerve endings of the parasympathetic system. Hence it produces a dual and strong action on the parasympathetic system but a single and lesser action on the sympathetic system.

Hypothetically, Banthine by paralyzing sympathetic ganglia would promote vasodilatation and by paralyzing the parasympathetics would relax uterine musculature and diminish uterine contractions. Hence the integrated effect would be a smaller contraction in the presence of an increased vascular supply and therefore less pain. The complete relief of gastrointestinal symptoms is probably due to paralysis of the vagus nerve, with diminished gastric secretion and gastric motility.

Since Banthine has no apparent neutralizing effect on endocrine secretions, there was no alleviation of the soreness of the breasts. Each patient developed a dry mouth, but the severe side-effects of glaucoma, bladder paralysis and tachycardia are not likely to occur from such small doses of Banthine.

SUMMARY AND CONCLUSIONS

1. The use of Banthine in primary dysmenorrhea is described in three cases.
2. A case of incapacitating dysmenorrhœa was converted to a mild dysmenorrhœa.
3. Two cases of moderate dysmenorrhœa were converted to slight dysmenorrhœa.
4. Though no definite conclusions can be drawn from only three cases, the results were so satisfactory as to warrant investigation on a larger scale. This article is presented as a preliminary report. Further investigation by the double placebo method is to be carried out.

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857 Sargent Ave.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

EXPERIMENTAL RESTORATION OF THE COMMON BILE DUCT

GORDON MURRAY, M.D.,
F.R.C.S.[C. & Eng.] and
JOSEPH M. JANES, M.D., *Toronto*

To ONE doing biliary tract surgery, the problem arises sooner or later of replacing most or part of the common bile duct. Because of the necessity of dealing with this situation adequately a good deal of experimentation has been undertaken. It is the purpose of this short presentation to mention briefly some of the experimental literature on the subject, and to describe a method of replacing a portion of the common duct and the results obtained.

Among the experimental methods attempted, the use of rubber tubes,[1] glass tubes[2] and foreign tissue grafts may be mentioned. Davis and Lewis[3] have used portions of transplanted fascia from the abdominal wall to fill in defects in the common bile ducts of dogs. They do not report satisfactory results lasting for more than two months. Molineus[4] has suggested the use of the appendix, but so far as is known this has not been tried except in the cadaver. Stropeni and Giordano[5] have advocated the use of a section of vein. They replaced 5 cm. of common bile duct by an equal piece of vein and report that two months after operation the dogs (they do not state the number) showed no icterus and the stools were of normal colour. In their article they mention that Tiestse used a piece of artery 4 cm. long, but the dog died after eight days, of bile peritonitis due to perforation. They state that Noferi replaced a part of the common bile duct by a portion of ureter in a dog, with good results. Davis[6] grafted a piece of vein into an opening made in the gallbladder of a dog. After a period the dog was killed and it was found that the graft had taken perfectly.

Horsley[7] in a comprehensive study used everted vein segments to bridge defects in the common duct of dogs. His conclusion was that while it was possible to reconstruct the common bile duct with an everted segment of vein the final result was unsatisfactory. "When a dog recovered from the immediate effect of the operation it did well for several weeks; but if the animal was permitted to live long enough, it became ill from one to three months after operation."

The work of the present authors amounts to a repetition of the work of Stropeni and Giordano. A segment of autogenous external jugular vein 4 cm. in length was removed from the dog and inserted between the divided ends of the common bile duct. It was usually inadvisable to remove any of the common bile duct because of the retraction of the divided ends. The technique of the anastomosis is similar to that used by one of us (G.M.[8]) for venous grafts to replace segments of arteries. Fig. 1 shows the anastomosis partially completed. Omentum was placed around the suture lines.

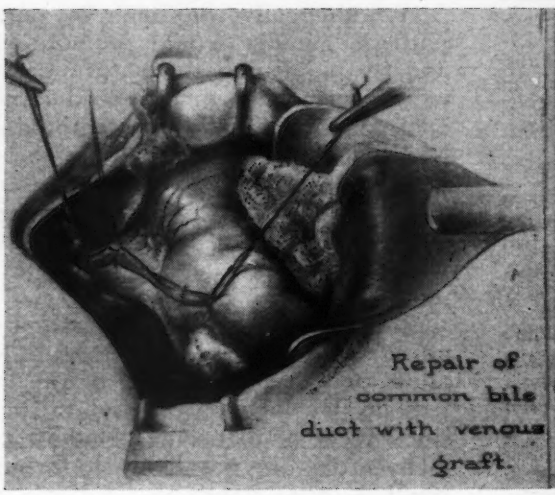

Fig. 1

Fig. 2

Fig. 1.—Technique of repair of common bile duct with venous graft. Fig. 2.—D 24—Venous graft surrounded by omentum 21 days after insertion. The lumen was still patent.

Several dogs died of bile peritonitis on the third to fifth day, due to leakage of bile from either one of the anastomotic junctions. We wish to record the course of four dogs which survived the operative procedure for more than one week. D 24 lived 21 days. At necropsy the lungs showed bilateral pneumonia. The peritoneal cavity contained a large quantity of bile-stained fluid which had apparently escaped from a ruptured biliary abscess surrounding the common bile duct. Fig. 2 is a photograph of the venous graft surrounded by omentum. Note the many small openings in it (apparently branches). Note also that the lumen is still patent 21 days after insertion.

D 22 lived 44 days. The dog showed no icterus for 29 days. At necropsy the peritoneal cavity was filled with pale straw-coloured ascitic fluid. The inferior vena cava and portal vein were greatly distended, apparently due to pressure on them by the common bile duct. The common bile duct was dilated to the size of the gallbladder. The graft was greatly shrunken and appeared to be nothing but a fibrous cord. The cause of death

was apparently a gradually developing obstructive jaundice. Fig. 3 is a drawing showing the liver, gall-bladder and associated ducts and small portion of the duodenum.

D 28 lived 42 days. There was no jaundice for 11 days. By the 29th day the mucous membranes of the mouth were definitely icteric and the stools clay-coloured. At necropsy the common bile duct was dilated to at least five times its normal size. The graft was not patent. The cause of death was apparently a gradually developing obstructive jaundice.

B and W lived for 53 days. No jaundice was apparent for 33 days. The dog was sacrificed 20 days later, at which time it was markedly icteric. The common duct was tremendously dilated as in the case of D 22. The graft (Fig. 4) was patent except at one spot, which appeared to be the superior anastomotic junction. Fibrosis was quite marked 53 days after insertion.

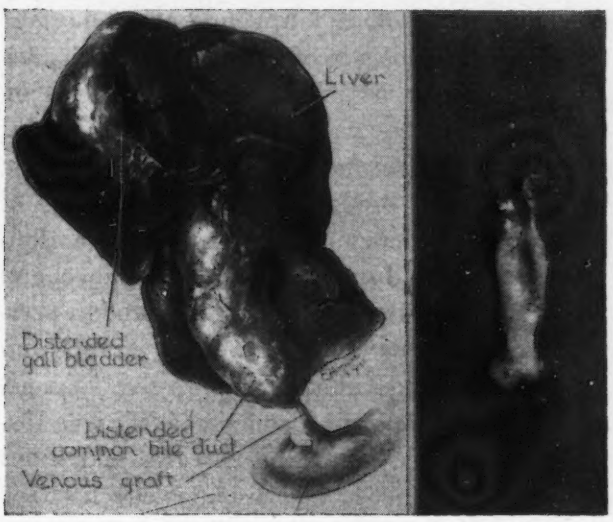

Fig. 3 Fig. 4

Fig. 3.—D 22—Fate of venous graft in common bile duct 44 days after insertion. Note contracted and constricted graft and the marked dilatation of the common bile duct.
Fig. 4.—B & W—Venous graft from 53 days after insertion. Fibrosis quite marked. Lumen patent except in one area but reduced in calibre.

The fate of the venous graft is one of contraction and constriction due to fibrous tissue. There appears to be a definite sequence of events following the transplantation of a piece of vein to bridge a defect in the common bile duct. After operation the animal does well for a certain period (as long as 33 days in our experience). Jaundice then begins to develop and gradually increases in severity until the animal dies. The explanation of this is that there is a gradual contraction and constriction amounting to complete obliteration of the lumen for at least part of its length.

These results are similar to those which Horsley[7] obtained when he used everted vein segments to bridge defects in the common bile duct of dogs. The contraction of the segment of vein may be due to the irritating effect of the bile or the lack of sufficient blood supply. Horsley points out that the constriction and occlusion of the graft is due to the contraction of the connective tissue. It would seem that the everted vein segment or non-everted vein segment alone does not provide adequate material for the plastic repair of the common bile duct in dogs.

With the evidence that venous grafts could not permanently be used for repair of a common bile duct, it was suggested by one of us (J.M.J.) that it might be worth while trying a vitallium tube. As stated earlier, many forms of foreign material were used with varying success but the special qualities of vitallium suggested that some experiments with this material might be worth while. In dogs the common bile duct was divided and a vitallium tube 4 cm. in length with 4 mm. lumen and with a low ridge around each end was placed in the duct and tied with silk. The slight flange at each end prevented slipping of the tube in either direction. It was with considerable satisfaction that we exposed these tubes at intervals of three months over periods of 2½ years. The area in all cases was incorporated in scar tissue. The tubes were *in situ* and functioning. The animals had no symptoms or evidence of bile duct obstruction or of liver disease. Now, eight years after the insertion of the tubes, the dogs are alive and well with the vitallium tubes acting in segments of the common bile ducts. It has been of considerable interest to read a report by Pearse[9] of a vitallium tube being placed in the common bile duct of a patient. From the experimental evidence alone, there are some prospects that tubes of this metal may be of considerable value in bridging gaps in or repairing stenosis of common bile ducts.

SUMMARY

1. A brief résumé of experimental work on restoration of the common bile duct has been given.

2. The course of four dogs with non-everted, autogenous venous grafts in the common bile duct has been outlined.

3. The unsatisfactory results have been discussed.

4. The successful use of vitallium tubes to replace a segment of the common bile duct for periods up to eight years in dogs has been reported.

The financial assistance to one of us (J.M.J.) by the Department of Medical Research, University of Toronto, and the financial assistance by the Banting Research Foundation in providing material for this work, is gratefully acknowledged.

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Canad. M. A. J.
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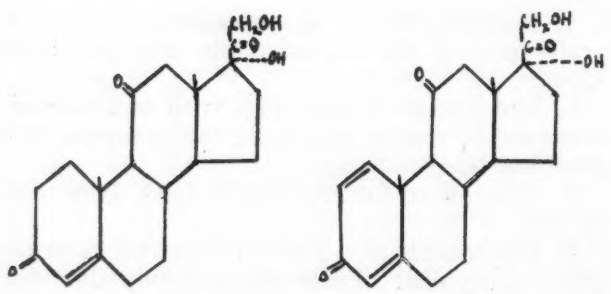
Editorials

PREDNISONE

Prednisone, formerly known as metacortandracin, is the outgrowth of the search for a drug having the beneficial effects of the adrenal cortico-steroids without their undesirable side-effects. The steroid molecule has been modified by dehydrogenation at positions 1 and 2 of the cortisone nucleus. Its structure is compared with that of cortisone in Fig. 1.



Cortisone Prednisone

Fig. 1

The first clinical report on the use of prednisone by Bunim and co-workers[1] appeared in January 1955. Their studies demonstrated that prednisone behaves like an adrenal cortical hormone in that, during treatment, there is a prompt and significant fall in the number of circulating eosinophils and a suppression of the urinary 17-ketosteroids. It was shown to be an effective antirheumatic agent in the seven patients with rheumatoid arthritis who received treatment. Each of the indexes of objective joint change, namely, swelling, tenderness, warmth, pain on motion and range of motion were significantly, rapidly and consistently improved in these patients. Histological examination of synovial biopsy specimens taken before and during administration of prednisone demonstrated a marked subsidence of inflammation. These results were obtained with a dose only one-third that of cortisone. In fact, change-over from cortisone or hydrocortisone to prednisone in this lesser dosage improved symptoms more effectively.

Balance studies on two patients for 12 successive days showed no sodium retention and no loss of potassium or nitrogen. Later reports[2, 3] confirmed this absence of electrolytic disturbance on doses up to 50 mgm. per day. Patients on cortisone with œdema had a diuresis with weight loss when prednisone was substituted. During treatment with prednisone there was a rise of hæmatocrit, hæmoglobin value, and serum albumin level and a drop in serum globulin level and sedimentation rate. The C-reactive protein present in all patients before treatment disappeared in every instance during suppressive dosage. Early reports indicate that in other chronic diseases such as asthma, skin diseases and lupus erythematosis, in which cortisone is effective, the use of prednisone has met with similar success.

Undesirable side-effects were reported in the first patients to be treated but they were of a minor nature. More recent reports[2, 4] of patients treated over a longer interval have noted a disturbing increase in major side-effects such as peptic ulcer and depressive psychosis. A decrease in glucose tolerance has been reported and it would appear that the diabetogenic properties of prednisone will require close scrutiny.

Prednisone, then, has been shown to be just as effective as other adrenocorticosteroids. In therapeutic doses it does not disturb the electrolyte balance. Patients requiring long-term therapy with this new synthetic steroid will merit the same careful observation as patients taking cortisone, since undesirable side-effects do occur.

N. W. MCQUAY

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Editorial Comments

CANDY MEDICATION

The Committee on Toxicology of the American Medical Association has recently (*J.A.M.A.*, 158: 44, 1955) issued a report on what it calls candy medication, namely the dispensing to children of medicaments disguised as candies. Attempts to improve acceptability of drugs by sick children, usually the most fastidious of clients, are of course not a new development. The brimstone and treacle so freely dispensed by Mrs. Squeers springs to mind as a rather unsuccessful effort in this direction, and there is a long list of elixirs and syrups in the older pharmacopœias. The A.M.A. Committee report, however, refers in particular to the deliberate simulation of candy by drug manufacturers, a development about 20 years old. This practice now includes the dispensing of antibiotics, anticonvulsants, antihistaminics and salicylates. The A.M.A. was concerned with the increase in risk of poisoning of young children, especially by candy types of aspirin, which have been freely sold over the counter since 1948.

As might be expected, it was found difficult to assess the exact role of candy medication in the great increase in fatal and non-fatal aspirin poisonings in young children, but the fact that five times as many deaths from aspirin at preschool ages occurred in 1951 as in any pre-war year, and the fact that 73 out of 84 cases of aspirin poisoning at the Chicago Poisoning Centre were due to flavoured "baby" aspirin, are very suggestive.

The Committee therefore feels bound to issue a warning against the casual attitude generally adopted by the public towards these products, and against misleading advertising suggesting that the drugs are safer than they in fact are.

ASBESTOSIS

Canadian production of asbestos is centered in the provinces of Quebec, Ontario and British Columbia, in that order of importance. Approximately one million tons of this mineral were mined in Canada in 1951. Fibres of the asbestos are either manufactured in textile processes or they are ground and the resultant material is used to impregnate boards or tiles. Asbestosis is a pneumoconiosis due to the inhalation of asbestos dust. Although the first case was recorded in 1900, our knowledge of the disease dates from 1924. The condition has been confused by some with silicosis, but the histological appearance of the lung and the apparent mode of action of the dust particles are different in each disease.

Asbestos plant dust is composed of broken fibres of chiefly hydrated magnesium silicates. Following inhalation, most of the dust is filtered off by the nose or expectorated from the upper respiratory tract. Some fragments, however, reach the terminal bronchioles and alveoli. Here the asbestos material, it has been postulated, produces its effect by a direct mechanical action on the respiratory epithelium. There is a fibrotic response to this traumatizing effect of the asbestos crystals. Prior to this fibrosis, there is an outpouring of lung fluid which is consistent with the classical "ground glass" x-ray appearance of the lung parenchyma at this time. The histological picture is of a peribronchiolar fibrosis which slowly spreads and produces a fine interstitial fibrosis. At this stage the cardiac silhouette becomes somewhat blurred when visualized radiologically, the so-called "shaggy heart."

Finally, large areas of fibrosis are apparent with concomitant emphysematous changes at the apices and bases of the lungs. The whole process is essentially an insidious one; it has been estimated that as much as seven years of exposure may be required to stimulate peribronchiolar fibrosis.

Asbestos bodies may be demonstrated in the sputum or in the lungs of those who have been exposed to the dust even for short periods. These bodies are long golden yellow fibres with bulbous ends. They are thought to be asbestos crystals surrounded with a coating of foreign-body giant cells and they vary in size from 20μ to 200μ.

The asbestotic will often complain of a dry cough, pains in the chest and shortness of breath. Clinical examination in the initial stages is invariably negative but later râles may be detected, together with diminished expansion and overbreathing on exertion. Clubbing of the fingers is often noted when the condition has become well established. Elevation of the diastolic blood pressure and accentuation of the pulmonary second sound have also been recorded. The total number of fatal cases is too small to permit an accurate evaluation of the prognosis. However, it is probably true to say it is a disease which by itself will not usually progress to a fatal issue. It frequently remains a condition which can be tolerated relatively well provided another serious disease does not supervene.

Asbestosis differs from silicosis in that it is much slower in onset and it does not produce the miliary nodular fibrosis found in the latter condition. In addition the silicotic has an increased susceptibility to pulmonary tuberculosis which has not been observed in asbestosis to any significant extent.

There is no known specific treatment for asbestosis. Prophylactically, dust control and medical selection of workers have much to offer. Dust sampling should be assiduously carried out. In Canada the recommended maximum allowable concentration of asbestos is 5 to 10 million particles per cubic foot of air. J.D.M.

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Canad. M. A. J.
Aug. 1, 1955, vol. 73

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TOXOPLASMOSIS

The clinical features of congenital toxoplasmosis with chorioretinitis, meningo-encephalitis, mental deficiency and central calcification are well known. Hall *et al.*[1] have recently commented on the rashes which may occur: these are usually petechial or purpuric, and the authors suggest that they may be related to hypoprothrombinæmia, low platelet count, allergic reaction or embolism in the parasitæmic stage. The same authors also comment on the erythropoiesis, anæmia, jaundice, and enlargement of liver and spleen which may suggest a diagnosis of hydrops fœtalis. It has been postulated in the past that the jaundice in this disease has been due to liver damage, but Hall *et al.* suggest that the jaundice is due to blood destruction.

Congenital toxoplasmosis was previously considered to occur entirely in infants, but there are now well-authenticated cases of adult infection. Campbell and Clifton[2] have described a young man and an adolescent girl with toxoplasmosis: the disease was characterized by cerebrospinal fluid changes, neurological abnormalities, splenomegaly and rashes. What is of greater interest is the fact that the mother had what was considered to be toxoplasmosis. Sabin[3] has pointed out that there is no satisfactory evidence that the organism can cause chorioretinitis through a postnatally acquired infection. Duke-Elder *et al.*[4] have described a man aged 40 with a chorioretinal lesion who eventually became blind; the eye was removed at a later date and the histological diagnosis was considered to be a "probable toxoplasmic lesion." The same authors also examined 32 sections of granulomatous uveitis; it is of interest that about half showed structures resembling toxoplasma forms, but the authors conclude with the observation that the diagnosis of toxoplasmosis was highly improbable in these cases and that the histological findings, in the absence of confirmatory serological tests, have apparently a very limited value.

Studies in relation to clinical findings continue, but we must not forget the source of the infection. The disease occurs in the rabbit, dog, mole, pigeon, mouse, rat, squirrel, monkey, guinea-pig, wombat, baboon, vole, canary, sheep, cat and chinchilla. Cole *et al.*[5] have recently studied the human contacts of toxoplasma-infected dogs. Thirty-five out of the 37 persons who had been in contact with infected dogs stated that they were in good health but 10 were sensitive to toxoplasmin, and toxoplasma antibodies were demonstrated in the serum. Two of the 37 persons showed clinical evidence of toxoplasmosis: one woman died in hospital with a toxoplasmic encephalitis, and a small boy had chorioretinitis with manifestations of cerebral disease due to toxoplasmosis. The authors comment that infection can occur from a dog via sputum, saliva, vomit, urine and fæces.

Prior *et al.*[6] have recently described a case of adult toxoplasmic encephalitis in a young woman. It is of considerable interest that the woman's pet dog had had toxoplasmosis of the digestive tract, and the authors suggest that the woman might have been infected by the dog's vomit or fæces. They described a further female patient with a symptomatic toxoplasma parasitæmia; this woman's dog was also infected with the organism. The authors point out that further studies in pets should be made in relation to pregnant women and congenital toxoplasmosis.

W.F.T.T.

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CANADIAN ARTHRITIS AND RHEUMATISM SOCIETY

The sixth annual report of the Canadian Arthritis and Rheumatism Society shows the need for extension of the invaluable services this Society renders in Canada. The Society served nearly 6,000 patients in Canada last year, but arthritis and the rheumatic diseases have disabled 115,000 Canadians, of whom 50,000 are totally disabled. The following C.A.R.S. services must be intensified:

(1) Research—by supporting the increased volume of research activities at university medical schools and hospitals. (2) Mobile physiotherapy units—by increasing the number of mobile physiotherapy units from 65 to 90 or more in order to bring these services to doctors and patients throughout all Canada. (3) Travelling consultative services—to assist doctors and patients in areas where clinics and private specialists are not available.

In addition to these direct services, the Society must continue to co-operate with the medical profession and hospital authorities to assist in making available more beds for inpatient treatment, and with government authorities to ensure improved services of job rehabilitation.

ALDOSTERONE: A REVIEW

SODIUM has been known to be involved in the genesis or in the maintenance of arterial hypertension and of generalized œdema since the work of Ambard and Widal at the turn of this century. But the factors governing its regulation were totally unknown until 1927 and 1932, when Baumann and Loeb and their collaborators demonstrated that adrenal insufficiency was characterized by marked urinary loss of sodium with a subsequent decrease in plasma concentration and by potassium retention. This loss could be relieved to a certain extent by a high sodium and low potassium diet, but only the administration of active adrenal extracts, which had been prepared in 1930 by three different groups of investigators led by Hartman, Rogoff and Swingle, could fully correct this deficiency as well as the disturbances in carbohydrate metabolism and the diminished resistance to various stressing agents.

In the mid-thirties some 28 hormones, all steroidal in structure, were isolated from these adrenal extracts by Reichstein, Kendall, Wintersteiner and their respective groups. The subsequent study of these hormones led to the elaboration of several biological tests for their detection and measurement. Among these, one should mention Venning's biological assay of corticosteroids by their ability to promote glycogen deposition in the liver, Selye's cold survival test, Ingle's test for muscular performance capacity and the various bioassays for sodium-retaining substances. Of all the hormones isolated from the adrenal cortex, only a few were found to be even slightly active as regards mineral metabolism and the regulation of sodium. The greatest mineralocorticoid activity remained in what became known as the "amorphous fraction" because no more crystalline material could be separated from it. This "amorphous fraction," the residue remaining after extensive benzene and water partitioning and fractional crystallization, was found to be more than 10 times as active as 11-desoxycorticosterone, which was partially synthesized in 1937 by Reichstein and was the most potent steroid related to adrenal cortical substances in causing sodium retention. Because of the scarcity of the amorphous fraction and the excessive price of the commercial adrenal extract, desoxycorticosterone was extensively studied for its action on mineral metabolism and was used almost exclusively in the treatment of Addison's disease. It was found to correct the potassium, sodium and chloride disturbances but to have little effect on carbohydrate metabolism and on resistance of the individual to infections or to other stressing agents. In 1948, when cortisone became available, its use in conjunction with desoxycorticosterone in adrenal insufficiency was immediate because its action was complementary to desoxycorticosterone, but it was clear to most investigators that the adrenal factor responsible for the regulation of sodium and potassium was still to be found.

It is fully to the credit of Tait and Simpson that this factor was finally isolated in 1952 from beef adrenal extracts by application of the new and powerful tools provided by paper chromatography and by a sensitive bioassay using radioactive isotopes for the measurement of infinitesimal amounts of mineralocorticoid. These authors, in a most beautiful and logical series of experiments, were able to demonstrate that this factor, which they were able to obtain in crystalline form, possessed almost all the sodium-retaining activity of the whole extract and was a compound different from the known corticosteroids. Two other groups, Mattox, Mason and Albert from the Mayo Clinic, and Knauff, Nielson and Haines from the Upjohn Company, confirmed this finding later in 1953. The infinitesimal concentration of this new hormone and the difficulties encountered in its isolation made progress very laborious. It is a tribute to Tait and Simpson that so much progress was made in so little time and that finally this substance, with the collaboration of Reichstein, Wettstein and their groups from Basle University and the Ciba Company, was chemically identified in February 1954 and was called aldosterone. The chemical structure of this substance is 11β-21 dihydroxy-3,20 diketo-Δ^4-pregnene-18-al, or the 18 aldehyde of corticosterone. The former designation of electrocortin was discarded.

This hormone, isolated from beef adrenal extracts, was also found in hog adrenal extracts and in adrenal venous blood of rats, dogs and monkeys. Most important of all, it proved to be identical with the sodium-retaining corticoid found in 1950 by Luetscher and Johnson, and later by Venning and her collaborators, in the urine of normal humans and especially of œdematous patients with nephrosis or with congestive heart failure. It took 2½ years from the date of Tait and Simpson's first paper (*Lancet*, January 19, 1952) to the chemical identification of aldosterone in adrenal extracts and adrenal venous blood of animals and in human urine. One cannot but have the greatest respect and admiration when one sees such successes of organic chemistry and the resolving powers of the new research tools and techniques.

Since then a few milligrams of this precious hormone have been made available to several investigators in Switzerland, in Canada, in England and in the United States. With so little, much valuable information has already been gathered. It is important to remember that all the results obtained so far in man or in animals come from acute experiments, and from rather small dosages. Nothing is known so far about the effects of large doses (2 to 100 mgm. for ex-

Canad. M. A. J.
Aug. 1, 1955, vol. 73

ample) or of administration of different doses over long periods of time.

Experimentally, aldosterone is the most active of all the corticosteroids in maintaining adrenalectomized animals alive in optimal physical condition and also in the maintenance of normal renal function. It was found to be 20 to 30 times more active than desoxycorticosterone in promoting sodium retention and about 5 times more active than the same compound in increasing potassium excretion. It was also found to have one-half the activity of hydrocortisone in decreasing blood eosinophil counts, one-third its activity in inhibiting the ACTH release and one-fourth its activity in promoting glycogen deposition in the liver. Little effect was found on water excretion. It is not clear whether the aldosterone is secreted by the zona glomerulosa or by the zona fasciculata in the adrenal cortex.

In man, aldosterone was found in increased amounts in patients with œdema due to nephrosis, cardiac failure or cirrhosis and ascites, in normal subjects subjected to severe sodium retention, in eclampsia, in congenital adrenal hyperplasia and in Cushing's disease. It was not found in the urine of Addisonian patients or following bilateral adrenalectomy.

A new syndrome called primary aldosteronism has been described by Conn. This syndrome is characterized by a high urinary aldosterone, severe urinary potassium loss, low serum potassium, high serum sodium and alkalosis. Clinically, it consists in severe periodic muscle weakness and "paralyses," intermittent tetany, paræsthesiæ, and moderate hypertension but no œdema.

Aldosterone was completely effective in relieving the symptoms, signs and biochemical disturbances of Addison's disease in dosages ranging from 150 to 250 micrograms a day. Its action was found to be quite rapid, within 30 to 45 minutes after injection. One of its most interesting aspects in some of these cases was the observation that the brownish pigmentation characteristic of this disease decreased during administration of this hormone. It was found by the Mayo group to be inactive in rheumatoid arthritis in dosages varying between 200 and 1,000 micrograms for periods of six days. For these cases, as in one Addisonian patient of Mach, weight gains of three to four pounds were observed, part of which seemed to be due to water retention. This ineffectiveness in rheumatoid arthritis may be due to the fact that the dosage used was too small or because the antirheumatic effect necessitates the presence of an OH group on C_{17} which is lacking in aldosterone. The factors regulating the secretion of aldosterone are ill understood. It seems quite independent of ACTH secretion. Growth hormone may have an effect in increasing the aldosterone secretion but this requires more confirmation.

A most interesting observation by Venning, Beck and co-workers concerns evidence that variations in extracellular fluid volume may be one of the most important mechanisms regulating aldosterone production. If this is true, it would finally help to solve the relationships between the volume and osmo-receptors and some of the variations in urinary sodium excretion. The value of some recent work concerning the effect of serum potassium or of potassium intake on the regulation of aldosterone secretion is not too clear because of the crudity of extracts used for bioassay. It is necessary to emphasize the need for defining the best ways for hydrolysing, extracting and purifying urinary and plasma aldosterone. An accurate and ultrasensitive chemical method for the determination of amounts of aldosterone to the level of 0.01 microgram and above would be most welcome. Such a method is sorely needed to replace the bioassay used for gross quantitative measurements of aldosterone. No amount of statistical treatment of the figures obtained from the sodium-retaining bioassays in adrenalectomized animals can hide the wide variations in sodium output and in urinary Na/K ratio between individual rats of the same group or between groups receiving the same dosage of hormone or the same time-dosage of extract. In reviewing the literature on bioassay methods, one is often struck, and this is corroborated in our fairly large experience, by the absence of increased sodium retention and at times by a complete reversal of the response with the increased time-dosage of extract. It is, we believe, an error to submit to bioassay crude methylene chloride or chloroform extracts of urine without further purification now that good chromatographic systems are available for separation and purification. Nor is it permissible to transpose as micrograms of aldosterone the sodium-retaining effect of crude chloroform or methylene chloride extracts of urine. Any sodium-retaining effect of such extracts is the overall net effect of many sodium-retaining and sodium-excreting substances contained in these extracts. Since there are, besides the corticosteroids, many other substances both known and unknown in these extracts which may influence, one way or another, the sodium excretion or the Na/K ratio in adrenalectomized rats, interpretation of bioassay results from such extracts is liable to lead to much error and confusion. Unless the fiducial limits of bioassay results are indicated, one must take with several grains of salt the aldosterone equivalent of the sodium-retaining activity of plasma or urinary extract. Experience with these bioassays shows that, even with the utmost technical care, this aldosterone equivalent may have a very wide limit of confidence.

This field is fascinating indeed. Future research should be most promising and yield

important basic knowledge in the field of electrolyte metabolism.

JACQUES GENEST, M.D.,
F.A.C.P., F.R.C.P.[C.]

Clinical Research Department,
Hôtel-Dieu Hospital, Montreal.

Special Article

AN EVALUATION OF THE TUBERCULOSIS DIAGNOSTIC PROGRAMME IN ONTARIO*

S. A. HOLLING, M.D., *Toronto*

THE PAST FEW YEARS have witnessed an increased tempo in tuberculosis-prevention measures. Diagnostic programmes of various types such as regular chest clinics, community and industrial surveys, routine hospital admission chest radiography, routine pre-employment chest radiography and the examination of other special groups have been highly developed. Both official and voluntary agencies have contributed large amounts of money to finance these programmes. The expense and effort required to carry on this work have assumed large proportions, and it is essential that they be utilized to the best advantage in order to ensure maximum results. There has been a decided change in the tuberculosis situation in recent years. A shift towards the older age groups in the development of new disease and a rapid decline in the death rate from tuberculosis without a comparable decrease in the known incidence are some of the factors indicating a change which warrants close attention.

It is fallacious to base the value of different diagnostic programmes solely on a comparison of the number of cases found. Each has its particular merit and meets a special need, there being many avenues of approach to case finding, all of which have the objective of finding the unsuspected case of tuberculosis. Definite information on the tuberculosis problem in a given area is necessary so that each diagnostic programme can receive due recognition. The problem, therefore, is how best to utilize the various methods at our disposal. In order to accomplish this end, it is important that we understand the role of each diagnostic medium and what results might be expected.

PRESENT STUDY

In order to acquire a better understanding of the means by which active cases of tuberculosis are discovered, the Ontario Department of Health, in collaboration with the Medical Advisory Committee, Ontario Tuberculosis Association, and the sanatoria in the province, conducted a study of the source of diagnosis in all first admissions and readmissions to sanatoria for the year ending March 31, 1952. Detailed information was obtained as to:

1. The steps or reasons which initiated the original examination: contact with tuberculosis, mass surveys (community and industrial) and the various routine chest x-ray programmes for special groups such as new employees in industry, foodhandlers, students, school teachers, hospital employees, immigrants and admissions to general hospitals;
2. The agency referring the patient for the original examination: private physician, private chest consultant, Board of Health, and the patient on his own initiative;
3. The agency making the final diagnosis: private physicians in their own offices, private chest consultants, chest clinics including mass survey follow-up clinics and general hospitals;
4. The extent of disease after a period of observation in sanatorium following admission.

The records of 2,837 admissions were studied, 1,969 of these being first admissions and 868 readmissions to sanatorium.

RESULTS

The unknown case of infectious tuberculosis in the general population is the core of the tuberculosis problem. Any information on the distribution of such cases and the method by which they might be most likely discovered is of paramount importance. A study of first admissions to sanatorium therefore has great significance, especially with reference to the reason why the patient was examined in the first instance.

Examination of those in contact with tuberculosis always has been considered a prime requisite to a satisfactory control programme. This group constituted 10% of all first admissions. It is of interest to note that 38% of the contacts admitted to sanatorium had moderately or far advanced pulmonary tuberculosis. This raises the following questions: (a) Are all contacts adequately followed up? (b) Were some of the so-called contacts actually the infectors? (c) Did massive infection result in widespread infection at the onset?

It is significant that a high percentage of patients—57%—sought medical advice originally because of symptoms, and 60% of these had moderately or far advanced disease on admission. While it is understandable that so many of these

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Canad. M. A. J.
Aug. 1, 1955, vol. 73

TABLES I AND II.

SOURCE OF DIAGNOSIS IN FIRST ADMISSIONS TO SANATORIUM, TWELVE-MONTH PERIOD ENDING MARCH 31, 1952

TABLE I.*

INITIAL STEPS OR REASONS WHICH LED TO THE FINAL DIAGNOSIS

	Percentage
(1) Contact with cases of tuberculosis	10
(2) Symptoms	57
(3) Mass x-ray surveys	16
(4) Hospital admission chest radiography programme	6
(5) Other special group routine x-ray screening procedures (pre-employment, etc.)	9
(6) Special examination requirements (visas, etc.)	2
	100

TABLE II.

ACTUAL DIAGNOSIS MADE BY THE FOLLOWING AGENCIES

	Percentage
(1) Private physicians in their own offices	18
(2) Private consultants	7
(3) Chest clinics, including follow-up survey clinics.	56
(4) General hospitals (in-patients)	19
	100

*Table I refers to the original reasons which led to the examination resulting in a final diagnosis. This might have been done through the medium of any one of four different agencies (Table II); e.g. the 57% examined because of symptoms may have gone to a private physician, chest consultant, and chest clinic or even entered a general hospital, as was the case in 25% of the patients having symptoms.

patients had disease beyond the minimal stage, one cannot help feeling concerned that the symptoms were permitted to develop in such a high percentage of cases before discovery. This indicates the necessity for better education of the public on all phases of tuberculosis prevention and a more intensive case-finding programme.

TABLE III.

FIRST ADMISSIONS AND READMISSIONS

Actual diagnoses made by	*First admissions*	*Re-admissions*	*Total*	*Percentage of total*
Private general practitioners	348	130	478	16.9%
Private consultants	140	80	220	7.7%
Chest clinics	1,107	575	1,682	59.3%
General hospitals	374	83	457	16.1%
Total	1,969	868	2,837	100.0%

Community and industrial x-ray surveys now play a large part in our diagnostic activities. As considerable effort and expense are entailed in the conduct of such a programme, their value has been questioned in some quarters because large numbers of individuals have to be examined to find one case of active tuberculosis. The investigation disclosed, however, that 16% of the new admissions were discovered because of mass surveys, demonstrating the important role of this phase of the case-finding programme.

Thirty per cent of the cases found on mass surveys had pulmonary tuberculosis in the minimal stage. This figure is less than that usually quoted and may be accounted for by the fact that the disease, after a period of observation in sanatorium, frequently proves to be more advanced, because of the opportunity for intensive investigation.

The so-called compulsory programmes covering new employees in industry, foodhandlers and hospital employees yielded a high percentage of minimal cases—over 60%. In view of the proven higher incidence of tuberculosis in these groups, it would seem desirable to pay special attention to those groups which are not yet completely covered as is the case with hospital employees. Examination is mandatory by regulation for the latter.

The significant role of the private physician in the control of tuberculosis (Table IV) cannot be emphasized too greatly. It was illustrated by the fact that he either made or had an interest in the diagnosis in approximately 60% of all first admissions. Eighteen per cent were actually diagnosed by private physicians in their own offices.

Tuberculosis in general hospitals (Table V) has long been recognized as a serious problem, the extent not being too accurately known in the past. A better understanding of the situation was disclosed by this study. A total of 504 cases of active tuberculosis had been treated in general hospitals just before admission to sanatorium. This represented 21% of all first admissions and 10% of all readmissions to sanatorium. These included cases discovered because of the hospital admission chest x-ray programme, or admitted to general hospital with known tuberculosis, or were in-patients discovered to have tuberculosis during their stay in general hospital. (In 19% of first admissions to sanatorium active tuberculosis was diagnosed while the patient was still in general hospital, while in 2% the diagnosis was made after leaving hospital by agencies outside the hospital because of the findings in the admission chest film.) The value of the hospital admission chest x-ray programme is illustrated by the fact that 132 cases were discovered because of this procedure, although the programme at that time had not reached a relatively high standard of efficiency, as is now the case.

A frequent, regular, free chest clinic service, easily accessible to all sections of the public, is basic to an adequate control programme. As might be expected, the chest clinic played the major role in making the final diagnosis of active tuberculosis—56% of all first admissions and 66% of all readmissions to sanatorium.

TABLE IV.

THE ROLE OF THE PRIVATE PHYSICIAN IN DIAGNOSIS OF 1,166 FIRST ADMISSIONS AND 386 READMISSIONS TO SANATORIA

	First admissions to sanatorium	*Percentage first admissions*	*Readmissions to sanatorium*	*Percentage readmissions*	*Total*	*Percentage of total admissions*
(a) Diagnosis made in own office..	348	17.7%	130	15.0%	478	30.8%
(b) Referred for diagnosis to						
(i) Chest consultants.....	88	4.5%	29	3.3%	117	7.6%
(ii) Chest clinics.....	425	21.6%	170	19.6%	595	38.3%
(iii(General hospitals.....	305	15.5%	57	6.7%	362	23.3%
Total.....	1,166	59.3%	386	44.6%	1,552	100.0%

TABLE V.

TUBERCULOSIS IN GENERAL HOSPITALS

Admitted to hospital with tuberculosis or diagnosed after admission:	
First admissions to sanatorium.....	374
Readmissions to sanatorium.....	83
Diagnosed after leaving hospital because of findings in the admission chest film:	
First admissions to sanatorium.....	42
Readmissions to sanatorium.....	5
Total.....	504
17.7% of all admissions to sanatorium.	

TABLE VI.

REASONS FOR ORIGINAL EXAMINATION

	First admissions	*Re-admissions*	*Total*	*Percentage of total*
Contact.....	199		199	7.0%
Symptoms.....	1,119	470	1,589	56.0%
Mass surveys.....	314	17	331	11.7%
Pre-employment...	66	8	74	2.6
Foodhandlers.....	28		28	1.0%
Students.....	17	1	18	.6%
School teachers....	5	1	6	.2%
Hospital employees.	40	4	44	1.6%
Office patients of private physicians	13	1	14	.5%
Immigrants.....	13	3	16	.6%
Routine hospital admission chest radiographs.	119	13	132	4.6%
Others.....	36	19	55	1.9%
Routine sanatorium follow-up.....		331	331	11.7%
Total.....	1,969	868	2,837	100.0%

AGE GROUPS

In this investigation the inclusion of information about age groups would have been most helpful. Unfortunately it was not considered possible to do this under the circumstances. Information from other sources is available, however, which has an important bearing on the problem of adequate programme planning.

An intensive survey recently conducted in the District of Columbia (Washington, D.C.), U.S.A., disclosed that 25% of the active cases found occurred in the age group of 55 years and over, which constituted only 10% of the general population. The incidence of disease in this group was shown to be four times that in the younger age groups—15 to 54. This trend towards the older age groups in the development of tuberculosis is also borne out by the findings in Ontario. In mass surveys conducted by the Provincial Department of Health during 1951, 23% of the active cases were found in the age group 50 and over, the great majority being in males. In view of this situation, it is most important that special attention be paid to the older age group in case-finding programmes.

DISCUSSION

If the challenge to eliminate tuberculosis is accepted in the fullest sense, every means of finding early tuberculosis should be developed to the maximum. A realistic assessment of the problem indicates, however, that certain obstacles limit the achievement of an ideal objective under present conditions. Availability of funds and trained personnel are the two chief factors to be considered. Certain types of programmes such as a routine compulsory chest radiograph of foodhandlers and tuberculin-test surveys of the school population—especially the younger age groups—with the necessary follow-up required to discover the source of infection of children with a positive reaction, entail a great deal of work for the municipal board of health. Local organized health services for the most part are understaffed and a considerable number of municipalities still have the services of only a part-time medical officer of health.

If one had to set forth basic programme requirements, the following should be recognized: free, regular, frequent chest clinics easily accessible to the public, mass x-ray surveys and routine admission chest films for hospital patients. Ontario is fortunate in having such facilities developed to a high degree.

Other aspects of case-finding require attention. More education directed to all sections of the population offers the best means of achieving the hoped-for goal. Voluntary effort is in a unique position to assist in bringing this about, not only in the matter of education but also by stepping into the breach caused by lack of adequately

Canad. M. A. J.
Aug. 1, 1955, vol. 73

TABLE VII.

FIRST ADMISSIONS TO SANATORIUM, 12 MONTHS ENDING MARCH 31, 1952
CLASSIFICATION BY AGENCY WHICH MADE FINAL DIAGNOSIS

	Primary		Pleurisy with effusion		Pulmonary						Extra Pul.		Total	
					Minimal		Mod. advanced		Far advanced					
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Private general practitioners	5	1.4%	27	7.8%	59	16.9%	105	30.2%	114	32.8%	38	10.9%	348	100%
Private consultants	3	2.14%	6	4.3%	29	20.7%	50	35.7%	30	31.4%	22	15.7%	140	100%
Chest clinics	61	5.5%	40	3.6%	314	28.4%	478	43.2%	189	17.1%	25	2.2%	1107	100%
General hospital in-patients	9	2.5%	35	9.4%	51	13.6%	101	27.0%	72	19.3%	106	28.3%	374	100%
Total	78	4.0%	108	5.5%	453	23.0 %	734	37.2%	405	20.6%	191	9.7%	1969	100%

TABLE VIII.

FIRST ADMISSIONS TO SANATORIUM, 12 MONTHS ENDING MARCH 31, 1952, CLASSIFICATION BY TYPE OF PROGRAMME

	Contact	Symptoms	Mass survey	Pre-employ	Food handler	Student	School teacher	Hospital employee	Routine office Exam.	Immigrants	Hospital Adm.	Others	Total
Primary type	47	18	4	1		1		3			3	1	78
	23.6%	1.6%	1.3%	1.5%		5.9%		7.5%			2.5%	2.9%	4.0%
Pleurisy with effusion	8	90	3					1			6		108
	4.0%	8.1%	1.0%					2.5%			5.0%		5.5%
Pulmonary minimal	60	169	95	41	17	9	2	25	3	7	17	8	453
	30.2%	15.1%	30.2%	62.1%	60.7%	53.0%	40.0%	62.5%	23.1%	53.8%	14.3%	22.2%	23.0%
Pulmonary mod. advanced	59	369	171	17	10	6	3	8	5	6	56	24	734
	29.7%	32.9%	54.5%	25.7%	35.7%	35.2%	60.0%	20.0%	38.5%	46.2%	47.1%	66.6%	37.3%
Pulmonary far advanced	17	298	41	6	1	1		2	1		35	3	405
	8.5%	26.6%	13.0%	9.1%	3.6%	5.9%		5.0%	7.7%		29.4%	8.3%	20.5%
Extra pulmonary only	8	175		1				1	4		2		191
	4.0%	15.7%		1.5%				2.5%	30.7%		1.7%		9.7%
Total	199	1119	314	66	28	17	5	40	13	13	119	36	1969

trained personnel and supplementing the work of the official health agency where indicated, by supplying clerical assistance and help in organizing certain programmes.

As the diagnostic programme gains momentum and becomes more inclusive, the results of case-finding doubtless will show diminishing returns. This will be a sign that our efforts are meeting with success. There is the danger that, because of increased costs to find a case of active tuberculosis in a given programme, its value may be questioned and pressure may even be brought to bear to have it discontinued. This attitude of complacency can only result in failure. We must be prepared to intensify our efforts rather than to restrict them.

The study of source of diagnosis of cases admitted to sanatorium has yielded certain pertinent information which should be of help in evaluating present diagnostic programmes and planning for the future. The splendid co-operation of the various sanatoria is greatly appreciated, as it made possible this investigation.

PAYMENT FOR PLEASURE

At the casualty department of Guy's and, indeed, that of every hospital in this country, a great deal of medical and nursing time and of the country's money is spent upon the care of the drunk and comatose and the drunk and damaged. The other night, when a hardy warrior made his umpteenth entry (feet first) to Front Surgery, the expensive problem of alcoholism and its relationship to hospitals was again emphasized. In this instance, one drunken man required the consecutive services of: (i) 2 policemen; (ii) 2 ambulance men; (iii) 1 surgery porter; (iv) 2 nurses; (v) 2 dressers; (vi) 1 night A.H.S.; (vii) 1 take-in H.P.; (viii) 1 take-in H.S.; (ix) 1 radiographer, and (x) the nursing staff of the ward which had to house his malodorous presence overnight. This was not all—apart from the considerable waste of time, there was a wastage of money on x-ray films, dressings, suture materials and, lastly, the cost of board and lodgings in a teaching hospital ward for one night.—*Guy's Hospital Gazette*, 69: 255, 1955.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

Men and Books

LEISURE*

ANDREW M. CLAYE, M.D.(Leeds), F.R.C.S.(Eng.),† *Leeds, England*

"What is this life if, full of care,
We have no time to stand and stare?"

THERE ARE MANY OF YOU, I am sure, who are prepared to laugh at the idea that you have no leisure to use. However, it is a truism that it is the busiest people who have most leisure, while the lazy ones never have any time to do anything. Let us then think of some pastimes at which we may remain amateurs with any luck for most of our lives. An amateur, I may remind you, is one who cultivates a particular study or art for the love of it and not professionally. I must emphasize my own very amateur status in relation to the subjects I am going to discuss.

The medical profession is, I think, specially prone to suffer from too much shop. When doctors belong to a club that is open to all professions and occupations, they are liable to get together at a table for meals, and then it is difficult to keep off the eternal subject of medicine. In fact no determined effort is made to keep off it. Without being unduly standoffish to our colleagues when off duty, we should not neglect our friends in other walks of life. Our best recreation is something which takes us out of sight and out of hearing of medicine: it should be so engrossing that there is no *thought* of medicine either.

Inevitably I shall deal with occupations which have an interest for me personally. I shall not extol, for instance, the merits of chess, or of going to the movies regularly every week, or of playing hockey, none of which pursuits appeal to me.

I do not in any case want to talk about games, which have many merits, but are bound to play a smaller part in our lives as we grow older, and call for a certain amount of skill, which we do not all possess and cannot all acquire. With any luck we shall be able to *walk* for some time. In Yorkshire, where I come from, we have, besides our industrial towns and cities, scenery that is hardly beatable anywhere—to a Yorkshireman *not* beatable anywhere, because it is "washed by the rivers, blest by suns of home." Quite near Leeds there is abundance of moorland, a little farther away a succession of friendly valleys, the Dales, and only a hundred miles or so away the incomparable Lake District. Hill country offers the special charm that the same scene hardly ever looks the same twice. You need not necessarily climb very high to see the loveliest things. The most beautiful cloud effects I have ever seen were viewed, not in Switzerland or Norway or the Himalayas, but from the top of Ingleborough, one of our Yorkshire hills, on a fine day in the middle of October a few years ago: the next day I was atop of Ingleborough again, and it was almost as lovely, but entirely different. On reaching the tops, besides the feast provided for the eye, one has the feeling of accomplishment. The last few hundred feet are often very hard work, and you wonder whether it is really worth it. Then you reach the top, sit down and rest a few moments, enjoy a hearty meal and a magnificent view, and think what a tremendous fellow you are. To get the best results, one needs to be healthy, to look carefully after one's feet and to have a good pair of walking boots.

Fell-walking may excite the passion for record-breaking that is dormant in many of us. It is seen in its highest form in those who conquer Everest. Far, far behind come those who like to knock off one by one the peaks in a given district: peak-bagging the game is called. In the *Manchester Guardian* newspaper a year or two back the story was told of two men called Colin and Tim shaking hands at the top of a mountain in the Island of Mull because they had at that moment ascended every peak over 3,000 feet in Scotland, this one being the 543rd and last. I should add that those two had also climbed every peak in England over 2,000 feet—there are more than 350 of them—and every peak in Wales over 2,500 feet—there are more than 120 of them. There is still Ireland.

Now let me turn to recreation of the spirit unaccompanied by bodily effort. Music—I must say that though I find it easy to enjoy music, I do not find it easy to talk about. Most hobbies give one either intellectual or emotional experience or both. For me music is almost entirely an emotional experience. As Walter de la Mare has written:

> When music sounds, gone is the earth I know,
> And all her lovely things even lovelier grow;
> Her flowers in vision flame, her forest trees
> Lift burdened branches, stilled with ecstasies.
>
> When music sounds, out of the water rise
> Naiads whose beauty dims my waking eyes,
> Rapt in strange dreams burns each enchanted face,
> With solemn echoing stirs their dwelling-place.
>
> When music sounds, all that I was I am
> Ere to this haunt of brooding dust I came;
> While from Time's woods break into distant song,
> The swift-winged hours, as I hasten along.

Music can be divided into two categories—the music you make yourself and the music made by other people that you listen to. It is better for your own soul if you make it yourself—the beneficial effect on other people's souls is more doubt-

*Address before the McGill Osler Society at its Annual Dinner, March 5, 1955.
†Chairman of the Department of Obstetrics and Gynæcology, University of Leeds, Leeds, England.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

ful. My own experience is limited to playing the piano and singing. Singing in a chorus gives one a pleasure that is quite different from anything else. It calls for great concentration if one wishes to carry out the conductor's instructions and, therefore, it entirely blots out for the time any worries one may have about patients or what you will. In contrast with solo singing, it is not likely to cause distress to more than the persons sitting on each side of one, unless one's voice is terribly loud as well as terribly bad. There are such voices: by a dispensation merciful at any rate to them their owners seldom realize that they possess these qualities. This is particularly noticeable in conductors, who appear to enjoy singing the difficult passages over for the chorus to follow: I have yet to hear a conductor whose voice is even tolerable. I find an attraction in learning new music, hearing the horrible noise made by the chorus in the first few weeks of attempting a work, say of Britten or Vaughan Williams, gradually replaced by sounds which it is pleasant to listen to; one's original hearty dislike of the piece is replaced by a growing affection for it. But it is not only the new works that have fascination. If one joins almost any chorus in Yorkshire one sings the *Messiah* at Christmas time, and this for many people is a very stirring event. Every re-singing draws one's attention to some point or points that have not been noticed before in this stupendous work, which Handel composed from start to finish inside three weeks. I am not alone in thinking that it is the great religious works in the choral repertoire that are the most moving: the *Messiah,* Bach's *St. Matthew Passion* and *B Minor Mass,* Elgar's *Dream of Gerontius,* and so on.

The fun to be got out of singing with others is not limited to large choruses. Three or four people singing glees together can entertain themselves, and possibly other folks too.

I have dwelt upon singing, particularly in chorus, because I have some experience of it, but if you can make music with a piano or a fiddle or a recorder, or any other instrument, you should try to keep it up, if possible in company with others.

Listening to music is for most people an easier, lazier occupation. In Leeds we have plenty of choice of concerts—choral concerts, orchestral concerts, chamber concerts, and so on. If you go to a concert and see the players and singers, it is very different from hearing them on the radio or gramophone. You get the atmosphere, and if the orchestra is thrilled with playing, the thrill is readily communicated to the audience. I remember feeling this particularly a few years ago when the National Youth Orchestra was playing in Leeds under Süsskind, a hundred or so 17- and 18-year-olds, boys and girls, all enjoying it enormously. But radio and the gramophone are not to be disparaged, or even TV, though I have little experience of that. In the course of a year the British Broadcasting Corporation provides at one time and another all the normal orchestral repertoire, some of it more than once, some very new works and some very old works, many works that are hackneyed, and many works that are almost unknown. The gramophone is particularly valuable if you wish to get to know a work well. You can play it over and over again, following if you like with a score. But of course you can enjoy a symphony without knowing anything about the score. The disadvantages of constantly repeating the same rendering is that you become conditioned to it, and tend to think any other version wrong.

I proceed from music to poetry, remarking as I go that singing sometimes forms an introduction to poetry. I first met Walt Whitman seriously when learning Vaughan Williams' *Sea Symphony,* and Walt Whitman was for several years a patient of the great man we are commemorating.

Interest in poetry is almost bound to be more selfish than interest in music, because you must do it mostly by yourself. When you play or sing or go to a concert or listen to the gramophone, that is often done in the company of others. The purely selfish way of enjoying music or poetry has the advantage that you are not dependent on others: you can indulge when you are alone. Now there are many different forms of poetry, by no means all of them particularly highbrow, but all of them entertaining in their own way.

I should like to say a word about Shakespeare first, as being very much our greatest poet, looked up to and written about by the poets themselves, by Ben Jonson, by Milton, by Matthew Arnold, by Robert Bridges, among others. The remark is constantly being made—one has heard it several times on the radio—that enormous numbers of people are put off Shakespeare for good by being compelled to study him for examinations at school. If this is true, and I doubt it, these people must have been unfortunate in their English teacher. I was fortunate in that my English master implanted in me a love of Shakespeare and English literature that has grown with the years. It is impossible to speak of Shakespeare without saying things which have been said hundreds of times before, but something must be said. Shakespeare is, as Coleridge called him, "myriad-minded"; a master of delineation of character, he has shrewd comment on almost every situation a human being may be called upon to meet, and he has a supreme sense of word beauty.

Here is a passage from "The Merchant of Venice" that gives a lovely word picture — Lorenzo is speaking to Jessica, his lady love.

> How sweet the moonlight sleeps upon this bank!
> Here will we sit, and let the sounds of music
> Creep in our ears: soft stillness and the night
> Become the touches of sweet harmony.
> Sit, Jessica. Look how the floor of heaven
> Is thick inlaid with patines of bright gold:
> There's not the smallest orb which thou behold'st
> But in his motion like an angel sings,

Still quiring to the young-ey'd cherubins.
Such harmony is in immortal souls;
But whilst this muddy vesture of decay
Doth grossly close it in, we cannot hear it.

Shakespeare even realized that there were some unfortunate people with no taste for poetry, and wrote these lines in sympathy with them.

I had rather be a kitten, and cry mew
Than one of these same metre ballad-mongers;
I had rather hear a brazen canstick turn'd,
Or a dry wheel grate on the axle-tree;
And that would set my teeth nothing on edge,
Nothing so much as mincing poetry!
'Tis like the forc'd gait of a shuffling nag.

There is no end to the examples I might give. Don't forget the sonnets, entirely different from anything I have quoted so far.

My pleasure in poetry is almost entirely sensuous. To exaggerate somewhat, I would say that the sound of the words appeal to me more than the meaning. Let me give you an example of a beautiful-sounding passage—Sir Lancelot seen riding by in Tennyson's "Lady of Shalott."

All in the blue unclouded weather
Thick jewelled shone the saddle-leather,
The helmet and the helmet-feather
Burned like one burning flame together
As he rode down to Camelot.

Of course this is not just beautiful sound: it conjures in your mind a beautiful picture too—sound and sense are not easily separated.

Then there are the poems with an atmosphere of what Lord Wavell called "music, mystery and magic." Coleridge was perhaps the supreme master of these as in *"The Ancient Mariner"* and *"Kubla Khan."* What about this for atmosphere?

Like one that on a lonesome road
Doth walk in fear and dread,
And having once turn'd round, walks on,
And turns no more his head;
Because he knows a frightful fiend
Doth close behind him tread.

Do you remember ever feeling like that? That is from *"The Ancient Mariner,"* from which verses were read to Osler on the last night of his life. I am happy to remind you that Osler was introduced to Coleridge by an obstetrician, Arthur Browne of McGill.

Let us turn to an entirely different kind, so suitable for stinging criticism, the heroic couplets in which Dryden, Goldsmith, Samuel Johnson and Pope wrote most of their poetry. These are Dryden's lines on a fellow-poet, Shadwell, whom he cannot really have liked. Shadwell is called Og in the poem:

Now stop your noses, readers, all and some,
For here's a tun of midnight work to come,
Og from a treason tavern rolling home.
Round as a globe, and liquored every chink,
Goodly and great he sails behind his link;
With all this bulk there's nothing lost in Og,
For ev'ry inch that is not fool is rogue:
A monstrous mass of foul corrupted matter,
As all the devils had spewed to make the batter.
When wine has given him courage to blaspheme,
He curses God, but God before cursed him.

Somehow the rhyming of the lines in pairs, and the ending of the sentences at the end of the couplet, give point to the sentiments expressed.

Coleridge defined poetry as the best words in the best order. Which words are the most beautiful? I remember listening to the B.B.C. Brains Trust a year or two back when Commander Campbell was asked which he thought was the most beautiful word and his reply was 'paraffin'. Well, whether because of the particular combination of consonants and vowels, which make it up or whether because of the thoughts it evokes, I don't like 'paraffin'! The association of the consonants V, L and N always appeals to me, and so I put before you a line or two from Tennyson's *"Morte d'Arthur"* in which Arthur announces his departure—

I am going a long way
With these thou seest—if indeed I go—
(For all my mind is clouded with a doubt)
To the island valley of Avilion;
Where falls not hail, or rain, or any snow,
Nor ever wind blows loudly.

or—from the list of the rivers of Hell in 'Paradise Lost'

Far off from these, a slow and silent stream,
Lethe, the river of oblivion, rolls
Her watery labyrinth, whereof who drinks
Forthwith his former state and being forgets.

How do the poets achieve their effects? Some are easily explained. Take this passage—another from the *"Morte d'Arthur,"* where the sound is intended to give a sound picture of what is happening — programme poetry, like programme music, you might call it.

The bare black cliff clanged round him as he based
His feet on juts of slippery crag that rang
Sharp smitten with the dint of armed heels.

You can almost hear the metallic echo.

Lists of things have a charm of their own. Milton is particularly fond of them, and here is one of flowers from *"Lycidas."*

Bring the rathe primrose that forsaken dies,
The tufted crowtoe and pale jessamine
The white pink, and the pansy freak'd with jet,
The glowing violet,
The musk-rose, and the well-attir'd woodbine,
With cowslips wan that hang the pensive head
And every flower that sad embroidery wears.
Bid amaranthus all his beauty shed
And daffadillies fill their cups with tears,
To strew the laureate hearse where Lycid lies.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

But by no means all verse is as serious as what I have quoted. There is light verse like A. P. Herbert's or Barham's, the writer of the *Ingoldsby Legends*, or W. S. Gilbert's. Take as an example the Major General's song from the *Pirates of Penzance*:—

I am the very model of a modern Major-General,
I've information vegetable, animal and mineral,
I know the kings of England, and I quote the fights historical,
From Marathon to Waterloo, in order categorical;
I'm very well acquainted too with matters mathematical,
I understand equations, both the simple and quadratical;
About binomial theorem I'm teeming with a lot o' news—
With many cheerful facts about the square on the hypotenuse.
I'm very good at integral and differential calculus,
I know the scientific names of beings animalculous;
In short, in matters vegetable, animal and mineral,
I am the very model of a modern Major-General.

Then there is parody, to appreciate which you need to know the poem parodied. Finally there is that attractive variety known as nonsense verse, in which English is so rich. Edward Lear's *Nonsense Songs* for instance:—

The owl and the pussy cat went to sea
In a beautiful pea-green boat.
They took some honey and plenty of money
Wrapped up in a five pound note.
The owl looked up to the stars above
And sang to a small guitar,
'O lovely Pussy, O Pussy my love,
What a beautiful Pussy you are
you are,
What a beautiful Pussy you are.'

And there are Harry Graham's *"Ruthless Rhymes for Heartless Homes,"* Lewis Carroll's Alice books, and *The Hunting of the Snark*. Do you remember the opening of that epic? Worthy to be put in the same class as "Of man's first disobedience and the fruit" or "Arma virumque cano."

"Just the place for a Snark," the Bellman cried,
As he landed his crew with care,
Supporting each man on the top of the tide
By a finger entwined in his hair.
"Just the place for a Snark, I have said it twice:
That alone should encourage the crew,
Just the place for a Snark, I have said it thrice:
What I tell you three times is true."

The Snark was quoted by Osler in his valedictory address to the students of McGill. Then there are Belloc's "Bad Child's Book of Beasts," and "Cautionary Tales," with countless limericks such as the one attributed to President Wilson—

As a beauty I am not a star;
There are others more handsome by far.
But my face, I don't mind it,
For I keep behind it—
It's the people in front get the jar.

I find pleasure in learning poetry by heart. Lyon, late headmaster of Rugby, wrote: "The time to learn a poem is when you like it so much that you want to remember it." This has often happened to me, and for many years I used to learn a few lines as I shaved each morning. There are worse occupations. I also read it in bed. Osler, you may remember, said that only literature should be read in bed, never medicine.

It may interest you to know that Lord Wavell, our successful Commander in the Middle East when we were heavily outnumbered, derived great comfort from the poets. In the anthology compiled by himself he writes this of Francis Thompson's poem *"The Hound of Heaven:"* "I have used the magic of its imagery in my times of stress, to distract my mind from peril or disaster. I have repeated the words . . . . under fire, on a rough Channel crossing, in pain of body or mind."

We seem to have got far away from the quotations at the beginning of this talk, and to be now trying to

fill the unforgiving minute
With sixty seconds' worth of distance run.

As one of our minor poets wrote:

In works of labour or of skill
I would be busy too,
For Satan finds some mischief still
For idle hands to do.

All the same—

A poor life this if, full of care,
We have no time to stand and stare.

I feel sure that the great physician would have agreed with this. And to those who knew him personally I would say, with the Greek Epigrammatist, so admirably rendered by Cory:

They told me Heraclitus, they told me you were dead,
They brought me bitter news to hear, and bitter tears to shed,
I wept as I remembered how often you and I
Had tired the sun with talking, and sent him down the sky.

But now that thou art lying, my dear old Carian guest,
A handful of grey ashes, long long ago at rest,
Still are thy pleasant voices, thy nightingales, awake,
For death, he taketh all away, but them he cannot take.

28 Hyde Terrace,
Leeds 2.

OVER-EATING AND THE EMOTIONS

Over-eating as a sign of emotional hunger, and the simple obesity which follows it, may be associated with stress disorders of the skin, of the reproductive or locomotor systems, and others besides. It may be taken as a sure sign of deep discontent, and unsatisfied longing, however placid the surface appearances may be. Some times pathological under-eating ("anorexia nervosa") may swing over into its opposite.—Desmond O'Neill: *Doctor and Patient*, J. B. Lippincott Company, Philadelphia and Montreal, 1955, p. 113.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

GENERAL PRACTICE

PRESIDENTIAL ADDRESS, COLLEGE OF GENERAL PRACTICE*

J. H. BLACK, M.D., *Vancouver*

YOU HAVE GRANTED what I consider to be probably the highest honour offered a general practitioner, in allowing me to serve as your President for this coming year. I accept this responsibility with a deep sense of humility and an awareness of my own inadequacy. My confidence is well sustained, however, in knowing that the faithful assistance of your elected representatives and the membership at large will be available to me at all times during the next twelve months. It is with this thought in mind that I look forward to continued progress in the development of the College of General Practice of Canada.

At this time it is my privilege on your behalf to pay tribute to other organizations represented here today. The formation of this College was made possible by the assistance and co-operation of the Canadian Medical Association. We are deeply indebted to them and owe our continued allegiance to this parent body. It is stimulating to see here representatives of other medical groups whose problems and achievements resemble our own. The College of General Practitioners of the United Kingdom in its developmental stage is already giving commendable leadership to the general physicians of that land. We have closely watched the magnificent growth and achievements of the American Academy of General Practice over the past few years. They have pioneered this phase of medicine to the credit of the profession. We commend these organizations for the initiative they have shown, and we look forward in the future to an interchange of discussion on mutual problems in our effort to serve our profession and our people better.

I would be remiss at this time if I did not, on your behalf, take this opportunity to express our sincere gratitude to your retiring President, Dr. M. Stalker. Murray Stalker has given unstintingly of his time and talents in developing this organization. In a comparable manner we do honour also to our Executive Director, Dr. Victor Johnston, the father of this movement in Canada. We are proud that such men as Dr. Stalker, Dr. Johnston and Dr. Charles Gass, the Chairman of your Board of Representatives, have seen fit to promote this College for the future of general practice.

We believe that this College possesses great potential good, both for the profession and for the people of this country. Heretofore, for many years, specialty fields have developed their organizations through the Royal College. Through such groups they have made magnificent contributions to the progress of medical science, to the elevation of medical standards and to the public health. The basic medical service of general practice, however, has had no such leadership until recently, when there has come a general realization and spontaneous awakening that the field of general practice also has a community of interest, a unity of purpose and problems that are peculiar to its members alone. In assessing the role of the modern practitioner we cannot ignore the fact that the necessity to understand people is coming to have renewed significance. In the field of medical education and medical practice emphasis is shifting from "the patient as a disease" to "the patient as a human being." As life becomes more complex the anatomy of the patient's personality becomes of as much concern to the family doctor as the anatomy of his body. Good doctors will always appreciate the fears and failings of people. Day by day it becomes clearer that advancement in general practice through such an organization as our College fills a growing need in the progress of modern medicine. Already a greater feeling of self-reliance, hope and faith exists within the hearts of Canadian family doctors. This assures a more secure future for this facet of medical practice and augurs great success for the College and for the profession of medicine.

Since our inauguration a year ago, which made history in Canadian medicine, important developments have placed the College on a more firmly established basis. During the past year our most pressing considerations have been to define and delineate our specific aims and policies in such a manner that we can be certain they are sound and reasonable, and that they reflect the opinions of the majority of our members. If some of you are inclined to think that progress is slow in these respects, I hope you will bear in mind that crystallized principles emerge only after they have gone through the time-consuming process of study, discussion and evaluation.

More specifically, may I point out that this year chapters have been established in every province. It is of some significance that the number of members in each province bears a similar relation to the medical population of the province and that there has been an equal response both from rural and urban areas. To date our total membership approximates 1,000.

Membership is already proving to be a stimulus to our own men to pursue further studies. Before laying down requirements for continued training it becomes necessary for us to see that such courses of training are available. This involves not only co-operation with those who make courses available, but it also includes, on our part, assistance in formulating suitable courses in large centres and arranging for travelling teams to remote areas; in addition, it poses the possibility of properly handled correspondence courses for those in isolated areas who find it most difficult to get away frequently enough to fulfil the specified requirements. Your College will work hard to improve the facilities for postgraduate training for the general practitioner.

Since the establishment of this organization one year ago there has been a steady increase in the number of Canadian general hospitals with Departments of General Practice. It is

*Presented at the Annual Meeting of the College of General Practice of Canada, Royal York Hotel, Toronto, June 22, 1955.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

desirable that this policy be further developed. We feel that this applies equally to university hospitals, where in some cases it is now in effect.

There are now some 14 Canadian general hospitals co-operating with the College in developing internship training programmes for the general practitioner beyond the first year of rotating service. In many cases this includes a preceptorship course, which we feel is proving equally valuable for men entering general practice.

You will have noticed in your newsletter that the College is considering recognizing high competence in general practice by award of a fellowship or comparable degree. This is something our recent graduates are asking for. It would of necessity have to resemble the fellowship courses of other specialties. This is an unusual undertaking and something which has great potential possibilities. It is felt that we must move cautiously but firmly in this direction.

You will also have noted in your newsletter that the College has been searching for ways and means of undertaking a survey of general practice in Canada. It would appear that the basis for this survey has now been established and that the coming year will see the beginning of this very important project.

We are conscious of the fact that it is unwise for us to attempt more tasks than we can creditably perform. Nevertheless the enthusiasm of our members and the earnestness of our committees leads to new and additional proposals for worthwhile projects. We are convinced that sufficient progress has been made this year; in fact it is not only reasonable, but it is imperative that we seek the services of a part-time educational director. Your executive has given considerable thought to the matter, and you will have the opportunity to discuss this further in our meeting today.

As your new President let me assure you that an efficient Executive and a hard-working Executive Director alone cannot make this College flourish. The framework has now been set up and the degree of accomplishment this year will be dependent to a large degree on the activity of each and every provincial chapter.

We must go all out to increase our membership this year. There are still many men throughout the country who would benefit from membership and whose enrolment would enhance the prestige and strength of this organization. Let me warn you, however, that size of membership is not the primary goal of this organization. Rather than the most, we want the best men in general practice in the College. When offering to a physician the privilege of affiliating with this important body of organized medicine it seems to me we should emphasize, not what he will get out of it, but rather the contribution he is prepared to make to the advancement of his profession and to the public welfare.

In the field of postgraduate studies we shall continue to help chapters help themselves in arranging postgraduate facilities in their particular part of the country.

We have seen increasing interest taken by hospitals in our College during the past year. It will be the duty of our members to deal with hospitals in their locale.

Let us remember that it is not always easy for hospitals suddenly to change their programme to include departments of general practice and general practice internships or residencies. I would therefore plead that there be no unwarranted or precipitate action in such negotiations; rather let us have reasonable and rational discussion with our hospital boards in gradually bringing about this worthwhile programme.

Our College will continue to consult with medical educationalists, universities and other educational bodies in organized medicine in the fulfilment of our duties to our membership. Needless to say, the Executive will always welcome the suggestions and criticisms, not only of the chapters but of the membership at large.

In conclusion, I would hope that we continue to conduct our affairs in such a manner as to gain not only the confidence but also the applause of our contemporaries in organized medicine. We must continue to demonstrate sincerity of purpose and earnestness of deed, and show that this is a society to which men and women of proven worth may gain admittance, and in which they may retain membership only by demonstrating a desire and willingness to continue their medical study. Let us quarrel with no group but rather let us join with all our confrères in the promotion of high standards of medicine for the honour of the profession and the benefit of the public. The College of General Practice of Canada has been firmly established. It is your College. May it be an inspiration to you to keep it progressive, helpful and strong.

COMMITTEE ON FELLOWSHIP

THE COLLEGE of General Practice is a co-operative effort by general physicians to set up some standards of competence for themselves, using postgraduate study as one yardstick. Membership in the College is intended to assist the doctor. Though the rules of membership stipulate that a defined amount of postgraduate study will be done, there has been a feeling among many that an even greater stimulus may be needed. Perhaps we should copy the specialists who, through the granting of certification and fellowship degrees, have done much to raise the quality of their services as well as to make their fields more appealing to many younger graduates in medicine.

With this in mind the Board of Representatives of the College last year asked Dr. Glenn Sawyer to chair a committee to ascertain the feeling of

	All replies	*University and Royal College*	*Members of College of G.P.*
	439	31	408
1. Do you think the College of General Practice should set down a programme which would enable it to grant some mark of distinction to those who qualify?	Yes 409 No 24	Yes 29 No 1	Yes 380 No 23
2. Do you think a proper mark of distinction would be: Fellowship?	Fellowship... 219	Fellowship... 5	Fellowship... 214
Certification?	Certification. 184	Certification. 14	Certification. 170
Diploma?	Diploma.... 94	Diploma.... 16	Diploma.... 78
3. How many years of formal hospital training should be required for fellowship: (a) for those now in practice? (b) for graduates of the future? (a) Slightly more favoured one year rather than two years. (b) Nearly half favoured two years, and a considerable number suggested three years.			
4. How many years of practice: (a) for those now in practice? (b) for graduates of the future? The majority suggested five years for both groups of doctors.			
	Yes No	Yes No	Yes No
5. Should there be a written examination?	294 137	26 2	268 135
6. Should there be an oral examination?	348 73	27 2	321 71
7. Should the fellowship so granted be permanent or should there be continuing postgraduate study to maintain the award in good standing?	314 97	18 4	Continuing programme 296 93
8. Should there be an examination in basic sciences as well as clinical subjects?	106 309	8 19	98 290
9. Should the examination be set by members of a university faculty, general practitioners, or a board composed of both?	University... 10 G.P's..... 74 Both..... 326	University... 1 G.P's..... 1 Both..... 27	University... 9 G.P's..... 73 Both..... 299

its members in this matter across Canada and to make recommendations. Dr. Sawyer now reports that to get this information a questionnaire was prepared and sent to 620 members of the College and to 85 members of university staffs and members of the Royal College of Physicians and Surgeons of Canada. The response was very good. Of the 705 sent questionnaires 439 (62.3%) replied; of the 620 members of the College 408 (65.8%) replied; and of the 85 others 31 (36.5%) replied. The replies were very interesting to us, because this sort of study is the life-blood of the College.

Some of the questions submitted, with the tabulations of the answers received, are shown above.

Dr. Sawyer drew the following conclusions: "There was an overwhelming desire to have some mark of distinction. There was no uniformity of opinion as to what that mark of distinction would be, and this would require further study. One member of the university group suggested that the designation might well be *Master of General Practice*, and this might receive further consideration. A careful study leading to the establishment of some mark of distinction on a sound basis would appear to be the desire of the members. There is no indication that haste is required."

The Board of Representatives has asked that a Committee on Fellowship continue this study under the chairmanship of Dr. J. R. Ibberson of Calgary

GIFT FROM PHARMACEUTICAL MANUFACTURERS

A DISPLAY CASE and a carrying case for the gavel of the College of General Practice have been kindly donated to the College by the Canadian Pharmaceutical Manufacturers Association. At the presentation on June 22, Mr. David Menzies, President of Mead Johnson & Co. and President of the C.Ph.M.A., said:

"On Monday of this week the Canadian Pharmaceutical Manufacturers Association was honoured at the conjoint meeting presently in progress at which we were kindly given a place on the luncheon programme so that we might pay tribute to Sir Henry Hallett Dale by presenting him with our gold Medal of Honour. We find ourselves the recipients of still a further honour by being invited to participate with you, the members of the College of General Practice, for a few brief minutes in your session this afternoon. For this we are most grateful and we extend to you our cordial and heartfelt appreciation.

"June 17, 1954, was in truth an auspicious day in the annals of Canadian medicine because it marked the birth of the College of General Practice of Canada. This same date is also significant because on that occasion Dr. Clarence Routley, C.B.E., M.D., LL.D., F.R.C.P., presented to your Association a gavel made from a

Canad. M. A. J.
Aug. 1, 1955, vol. 73

portion of the plane tree under which Hippocrates sat while expounding his doctrines and philosophy to his disciples. This gavel will undoubtedly be cherished and revered by the members of your Association throughout the years to come not only because of its historical background but because of the personal relationship which has existed and which will continue to exist between the members of your Association and Dr. Routley, a true gentleman of science whom our Association has previously honoured with its gold Medal of Honour and who has had further honours conferred upon him during the present conjoint Convention.

"It occurred to the Executive of the Canadian Pharmaceutical Manufacturers Association that we might possibly be of some assistance in helping you preserve this valuable gift and perhaps in some small measure enhance its meaningfulness to you. With this purpose in view, we approached Dr. Johnston and Dr. Routley with a proposal, stressing that the action which we desired to take was merely one of offering the services of our Association and that in no way did we intend to detract from either the gift of Dr. Routley or the sentiments with which the gift was presented. Our motive, we pointed out, was instigated by a desire on our part to be of service. Our Association is constantly committed to render such service, to the end that we may both, your Association and ours, march hand in hand to greater achievements in the field of the medical sciences. We were pleased that our offer was accepted and now, on behalf of the C.Ph.M.A. it gives me a great deal of pleasure to present to your College and through you, Dr. Black, as its President, these two cases, a display case and a carrying case."

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

POLIOMYELITIS VACCINE

It is in a spirit of sympathetic understanding of the difficult position in which the experts have been placed by the popular demand for immediate action that observers over here have been following the unfortunate complications that have arisen in poliomyelitis vaccination in the United States. Due note has also been taken of Dr. A. J. Rhodes's statement at the combined meetings of the Canadian and British Medical Associations that 800,000 children in Canada have been given Salk vaccine and that not a single case of poliomyelitis has resulted from its use. In view of American experience, the Medical Research Council has decided to postpone until the late autumn the small pilot trial which, in April, they announced was to be carried out over here. Because of the limited amount of vaccine available in this country it had been decided that this should be used primarily for the inoculation of small groups of children in order to determine whether it was an effective agent against the types of virus encountered in this country. Clearly, even such a limited trial cannot be embarked upon until after the end of the present poliomyelitis season and until the process of manufacture has been rechecked along the lines indicated as a result of the current investigation being carried out in the United States.

GRANTS FOR MENTAL HOSPITALS

One of the major problems facing the unfortunate Minister of Health is the modernizing of the mental hospitals of the country. A report just published by the King Edward's Hospital Fund for London points out that the average age of the mental hospitals in the area which it covers is well over 50 years, and that "the majority date from the time when the mentally ill were looked upon primarily as potential dangers to the community." In some hospitals the patients' clothes are still rolled into bundles and tied to their beds at night, since no storage space is provided for them. The staffing position is equally serious. The number of student nurses has now fallen so low that in mental and mental deficiency hospitals there is only one student nurse to 42.5 patients, compared with one to 3.1 patients in general hospitals. The financial problem involved is exemplified in the fact that it is estimated that merely to bring the catering facilities up to date in the mental hospitals in the Fund's area (27 mental hospitals and nine mental deficiency hospitals) would cost practically £550,000 (nearly 1½ million dollars). As a contribution towards the alleviation of this disturbing state of affairs the King's Fund has decided to make an allocation of not less than £250,000, spread over three years.

COMMONWEALTH TUBERCULOSIS CONFERENCE

The Fourth Commonwealth Health and Tuberculosis Conference, organized by the National Association for the Prevention of Tuberculosis, has been as outstanding a success as its predecessors. Perhaps the three most interesting sessions were those devoted to chemotherapy, "do death rates matter?", and tuberculosis and leprosy. At the last of these, Dr. R. G. Cochrane, the consultant in leprosy to the Ministry of Health, struck a warning note about the claims that were being made for sulphones and BCG vaccination in the control of leprosy. He drew attention to the fact that at Carville relapses were now being encountered 15 years after apparent cure with sulphones, and he submitted to critical examination some of the claims that are being made for BCG vaccination as a means of producing immunity against leprosy. In the discussion on chemotherapy, Irish workers gave preliminary details of a new antituberculosis drug produced in the laboratories of the Medical Research Council of Ireland, which has already been submitted with "most encouraging results" to a small pilot clinical trial. In the discussion on "do death rates matter?", Dr. Hugh Paul, medical officer of health for Smethwick, deprecated what he considered to be the unjustified optimism about the falling death rate from tuberculosis. In his opinion the present position was far from satisfactory, and much more emphasis must be placed on prevention. A hospital bed cost £5,000 a year. Would it not be much more satisfactory, he asked, to spend this sum in building two houses and so help to relieve the present housing shortage which was one of the major causes for the persistence of tuberculosis in our midst?

DOCTORS AND STRIKERS

During the recent railway strike a part-time consultant to the board of governors of the United Birmingham Hospitals sent the following letter to one of the strikers, whose wife was a patient of his: "I am afraid that my principles prevent me from seeing patients on strike, except in cases of emergency. Do you mind postponing the visit with your wife? If you will phone for an ap-

pointment when the strike is over I will try to fix a convenient date." Needless to say, the socialist opposition in the House of Commons immediately seized upon this, and asked the Minister of Health what he proposed to do about this "completely unethical" act of "political discrimination." In spite of a fierce cross-examination, the Minister wisely declined to be budged from his original reply that the question of medical etiquette was not for him, nor was the matter of the private arrangements a doctor might wish to make with his private patients.

London, July 1955. WILLIAM A. R. THOMSON

OBITUARIES

DR. DAVID W. ALLEN, for many years a practitioner in Saskatchewan and Toronto, died in Toronto on June 25 at the age of 78. Dr. Allen, who was born in Trenton, Ont., graduated from the University of Toronto medical school in 1910. He practised in Weyburn, Sask., where he was surgeon for the Canadian National Railways, until 1924, when he took postgraduate work in England and Scotland. On his return to Canada in 1928, he established a practice in Toronto. During the war years he practised in Black's Falls, N.B. He retired seven years ago and moved to Vancouver Island, returning to Toronto last year. He is survived by his widow, one daughter, and two sons, one of whom is Dr. James Allen, of St. George, N.B.

DR. ADAM ERNEST CANTELON, 77, of St. Vital, Man., died on June 5. Dr. Cantelon was born in Streetsville, Ont., and graduated from Trinity Medical School, Toronto, in 1901. He practised at Hanley, Piapot and Stoughton in Saskatchewan until his retirement in 1931, when he moved to Winnipeg. He served with the Medical Corps in the first World War and in the second was medical officer of a cordite plant in Transcona. He is survived by his widow and four daughters.

DR. WALTER THOMAS CLARK, a medical missionary for 16 years, died at his home in Toronto on June 27. He was 82. Dr. Clark was born in St. Thomas and graduated in medicine from the University of Western Ontario. He was a medical missionary with the China Inland Mission, in West China, from 1901 to 1917. On his return to Toronto he set up practice, from which he retired in 1928. He is survived by his widow and three daughters.

DR. THOMAS DOUGLAS, 83, died at his home in Toronto on June 18, shortly after completing 59 years of service as a general practitioner. Born at Harriston, Ont., he attended Trinity Medical College in Toronto and in 1893, when he was 21, graduated as a silver medallist. He first practised medicine in Atwood and Monkton, Ont. In 1905 he moved to Moose Jaw, Sask., where for a number of years he served as medical officer of health. From 1917 to 1920 Dr. Douglas retired from medical duties to look after extensive land holdings in the West. In World War I he served as medical officer for the 180th Sports Battalion. In 1935 he moved to Toronto, where he established a practice. He is survived by his widow, two sons, and one daughter.

DR. E. FERNAND EMERY, of Montreal, died on July 4 in Maisonneuve Hospital after a long illness. He was 71. Dr. Emery, who was born in Montreal, was a pharmacist for 12 years before studying medicine at the University of Montreal. He was a medical examiner for the Prudential Life Insurance Company and the Metropolitan Life Insurance Company for more than 25 years, and was also on the staff of the University of Montreal. He is survived by his widow, three sons (one of whom is Dr. Paul Emile Emery of Stockbridge, Mass.), and three daughters.

DR. PIERRE-PAUL GAGNON, of Rimouski, Que., died on May 25 after a long illness, at the age of 60. He was born at Ste. Luce and was educated at the Petit Séminaire de Rimouski, from which he graduated in 1917 with the degree of Bachelor of Arts. He studied medicine at Laval University, graduating in 1921. After postgraduate work in Paris, he returned to Quebec in 1924 to study radiology and medical electricity, and in 1925 he settled in Rimouski, where he became head of the department of electrocardiology at St. Joseph's Hospital. From 1939 to 1945 he was chief medical officer with the Medical Corps at Rimouski military camp, serving with the rank of captain. He is survived by his widow, five sons, and five daughters.

DR. MEYER LOUIS HALPERIN, of Vancouver, died on June 10 at the age of 48. He had been in practice in Vancouver for the past 22 years. Born in New York, he was educated in Vancouver and attended the University of British Columbia for two years before going to the University of Alberta, from which he graduated in medicine at the age of 23. He is survived by his father, a sister, and a brother.

DR. JAMES HORACE KING of Cranbrook and Vancouver, member and former speaker of the Canadian Senate and Liberal cabinet minister in the British Columbia and Federal Governments, died of pneumonia in Ottawa on July 13 at the age of 82.

A native of Chipman, N.B., Dr. King graduated from McGill University in 1895 and began practice in the Maritimes. Three years later he moved to Cranbrook, B.C. to become the city's first physician and, in 1903, its representative in the Provincial Legislature. This marked the beginning of Dr. King's political career, but not, for some time, the end of his medical service through which, in the same year, he earned the distinction of being the first physician to reach the scene of the disaster which occurred at Frank, Alberta, when Turtle Mountain collapsed killing 66 people in the surrounding village. His medical reputation was even more widely established through his position as surgeon for the Canadian Pacific Railway in the Crow's Nest Pass.

It has been frequently suggested, though never confirmed, that Ralph Connor's novel, *The Doctor*, was based on Dr. King's life as a B.C. practitioner.

In the 1920's however the demands of public service caused him to give up his medical practice and devote his time to political duties, though he continued to maintain an interest in the work of the St. John Ambulance Association which he founded in British Columbia.

Dr. King is survived by his widow.

DR. ROBERT LAW, one of Ottawa's oldest physicians, died in that city on June 19 at the age of 81 after a long illness. He was born and educated in Ottawa and graduated in medicine from McGill University in 1899. From 1900 until his last illness he had an extensive practice in Ottawa. He was medical officer of health for the city from 1900 to 1911 and acting medical officer from 1914 to 1918. He was a past president of the Ottawa Medical-Chirurgical Society and was on the honorary consulting staff of Ottawa General Hospital. Surviving are one daughter and four sons, two of whom (Dr. William Law and Dr. Douglas Law) are practising physicians in Ottawa.

DR. HERBERT NEWTON McCORDIC, 82, died in Toronto on June 20 after a long illness. Dr. McCordic was born at Forest, Ont., of parents who were among the original settlers of the area. In 1902 he graduated

Canad. M. A. J.
Aug. 1, 1955, vol. 73

in medicine from the University of Toronto and, after interning in Sarnia and New York, returned to Forest to practise. Several years later he moved to Texas. Returning to Canada in 1913, he engaged in private practice in Edson, Alta., where he also was coroner, doctor for the Canadian National Railways, and medical officer of health. In 1930 he set up practice in Toronto, retiring in 1938 because of ill health. Dr. McCordic is survived by his widow, a son, and a daughter.

DR. OSCAR ANDERSON McNICHOL, who had practised as physician and surgeon in Toronto for over 30 years, died at his home in that city on June 21. He had been on the staff of the University of Toronto, where he lectured on anatomy, and was associated with the Wellesley and Grace hospitals. Dr. McNichol was born in Acton, Ont., and graduated from the School of Pharmacy in Toronto before entering Trinity Medical College, from which he graduated as medallist in 1907. He is survived by his widow and a daughter.

DR. LEWIS JAMES O'BRIEN, one of Alberta's pioneer doctors, died in hospital in Edmonton on June 14. He was 86. A native of Wilcox Lake, north of Toronto, he graduated in arts from the University of Toronto in 1897 and taught school in Ontario and British Columbia for three years. He then went to Germany, to study medicine at the University of Würzburg, and later took postgraduate work in Vienna, Munich, Berlin, London, Chicago, and Ann Arbor. After practising for a time at Nanaimo, B.C., he joined the staff of the Canadian Fifth Base Hospital, and served at Salonika. On his return to Canada in 1918, he began practice in the pioneer Grande Prairie district of Alberta. He retired 10 years ago. Dr. O'Brien was a Fellow of the Royal College of Physicians and Surgeons of Canada and president of the Alberta Medical Association in 1939-40. He is survived by a son, Dr. Hugh O'Brien of Dawson Creek, B.C., and a daughter. Another son, Dr. Gurth O'Brien, who had taken over the practice when his father retired, was killed in a plane crash near Grande Prairie in August 1953.

DR. FELIX ROY, 62, medical examiner for the Workmen's Compensation Board of Quebec, died in Quebec City on June 7 after a long illness. He was born at St. Pierre de Broughton and was educated at the Séminaire de Québec and at Laval University, from which he graduated in medicine. After practising for several years in his native town, he set up practice in the Limoilou quarter of Quebec City. In 1935 he was elected a member of the Legislative Assembly of the Province. In 1941 he was named Army medical examiner, an appointment which he held until 1944. At the same time he was appointed medical examiner for the Workmen's Compensation Board. Surviving are his widow and two daughters.

DR. HERBERT JOHN SCOTT, 63, an eye specialist of Winnipeg, died in that city on July 6. Dr. Scott, who was born in Collingwood, Ont., was educated at Queen's University, the University of Western Ontario, and the University of Manitoba. He also studied at the Royal Ophthalmic Hospital, Moorfields, London, and the Presbyterian Hospital, Chicago. He served in both World Wars. Originally an eye, ear, nose and throat specialist, he restricted his practice in late years to ophthalmology. He is survived by his widow and a son.

DR. ERNEST RAYMOND SELBY, 71, died at his home in Calgary on June 17. He had practised medicine at the Colonel Belcher Hospital and privately for 36 years. Dr. Selby, who was born at Bradford, Ont., graduated from the University of Toronto in 1913 and spent a year in practice in Calgary before going overseas with the 43rd Cameron Highlanders. He became commander of the Eighth Canadian Field Ambulance, with the rank of lieutenant-colonel, and on Armistice Day in 1918 was one of the first to enter the city of Mons, in Belgium. He received the Distinguished Service Order and was twice mentioned in despatches. He was an honorary chairman of the Calgary centre of the St. John Ambulance Association and in 1946 was named an officer brother of the Venerable Order of St. John of Jerusalem. Surviving are his widow and two sons, one of whom is Dr. Ray Selby of Calgary.

DR. FRANK WHITE STEVENSON, of Saint John, N.B., died in the Saint John General Hospital on June 29 at the age of 61. Dr. Stevenson, who was born in Lancaster, N.B., took his medical course at Bowdoin Medical School in Maine, from which he graduated with the degree of M.D., C.M. in 1918. Enlisting immediately after graduation, he served as captain in the Canadian Army Medical Corps. He had been a practising physician and surgeon in Saint John for many years and was a former member of the staff of the hospital. He is survived by his widow.

DR. WALTER CHIPMAN STOCKWELL, acting chief of the department of anæsthetics at the Royal Victoria Hospital, Montreal, died in that city on June 20. He was 47. Dr. Stockwell was born in Stanstead, Que., son of the late Dr. Henry P. Stockwell. He was educated at Stanstead College, Bishop's University, and graduated from McGill Medical School in 1937. During World War II he served overseas as a major in the General Hospital Unit. He is survived by his widow and four brothers, one of whom is Dr. William G. Stockwell of Montreal.

DR. CONDREN MAURICE STRONG, 71, died in Deer Lodge Hospital, Winnipeg, on July 9. Born in London, England, he came to Canada with his parents, first to Qu'Appelle, Sask., and later to Walsh, Alta. At 17 he enlisted for the Boer War. After working for a time as telegrapher for the Canadian Northern Railway, he entered Manitoba Medical College, from which he graduated in 1912. After two years of practice at Steinbach he went overseas as medical officer with the 44th Battalion. In 1919 he returned to Winnipeg after postgraduate study in London. He served on the staff of St. Boniface Hospital and for two terms was president of Misericordia Hospital staff. In 1944 he was president of the Winnipeg Medical Society. Surviving are his widow, a brother and a sister.

DR. AENEAS McKAY URQUHART, 61, of Preston, Ont., died on June 11, several weeks after an operation. Dr. Urquhart, who was born in Oakville, Ont., attended the University of Toronto for a year before enlisting in the Canadian Army. He went overseas with the rank of lieutenant and was posted with the British Army. While in action in France he was taken prisoner of war in March 1918. On his return to Canada he re-entered Trinity Medical School and graduated in 1924. Shortly afterwards he went to Preston, Ont., where he practised for the next 28 years. For the past few years he had been medical officer of health for the town. In World War II Dr. Urquhart enlisted with the Highland Light Infantry of Canada, and was attached as captain to the Canadian Forestry Corps, in Scotland. After serving overseas for two years, he was stationed in Canada with the Medical Corps until the end of the war. He is survived by his widow and two sons.

DR. HARCOURT B. CHURCH: We regret to report that Dr. Harcourt B. Church, a former president of the Canadian Medical Association, died at his home in Aylmer, Que., on July 17. An appreciation of Dr. Church will appear in the August 15 issue.

DR. L. J. O'BRIEN

AN APPRECIATION

Dr. L. J. O'Brien, one of the best known and most loved surgeons in Alberta, passed away in Edmonton on Tuesday, June 14. With him there ended an era for the Peace River country that he loved so much. He was a man of vast talent and could have made his mark anywhere in the world, but he chose to remain in what was then a remote and isolated area because there was need for him there and he loved the open country.

Like Sir William Osler he was born a short distance north of Toronto, and like his famous predecessor he taught school for a time before setting out in pursuit of his M.D.

At that time Germany was the centre of medical progress and while L. J. was doing his pre-medical course at Toronto he feared that he would be too old to do postgraduate work, because he had used up so much of his life savings for the medical course. As he had taught German, he hit upon the alternative of going to the University of Würzburg and taking his M.D. in German. He enrolled in 1900 and emerged two years later with his M.D., having written his thesis in German on metastatic bone formation in arteries. After some time in the schools at Vienna, he returned to Canada, where he took the post of assistant medical officer at the collieries at Nanaimo, B.C. Soon after graduating he married and founded the famous O'Brien family so well known to residents of Northern Alberta.

In 1908 he returned to do postgraduate work in Germany for six months. Dr. O'Brien went overseas with the Fifth Canadian General Hospital and after three months in Britain he spent 21 months doing surgery in Salonika. He was asked to stay at Victoria on his return to Canada in 1917, and did surgical work for the Army for six months. 1918 saw him on his way to the Peace River country, where he was to spend the rest of his days. At that time there were excellent opportunities in Vancouver, but, ever selfless, he decided to use his surgical talent where there was most need for it. Certainly the log hospital was not the most desirable place for an honorary F.R.C.S. to do bone surgery. However, his patients did remarkably well and his reputation spread. He never pressed for fees, and when a patient paid him for an operation he was as pleased as if he had been given a present. Most of his bookkeeping was in his head. He seldom sent a bill for his services.

His car was seldom used for town calls, and he was a familiar figure striding up to the hospital on a winter morning with his bearskin coat and furlined pants. Many times he ventured into the frozen country in mid-winter to help a sick person. These excursions by horse and later by model T would occupy days at a time, and he was not always paid except by the esteem in which he was held.

He took his family for long trips into the mountain areas and instilled in them a love of nature, of which he was the keenest student. Within the last few years his family has been cut down. Three of his four boys met violent or unexpected ends and his wife passed on a few months ago. He hoped that he would be spared long enough to receive the honorary degree given to him at the last Convocation of the University of Alberta. He is survived by a son and a daughter.

ABSTRACTS *from current literature*

MEDICINE

Cardiac and Non-cardiac Chest Pain: A Statistical Study of "Diagnostic" Criteria.

MASTER, A. M., JAFFE, H. L. AND PORDY, L.: ANN. INT. MED., 41: 315, 1954.

The diagnosis of chest pain has always been an important medical problem. With the increasing life span and the resultant increase in the incidence of coronary heart disease, anginal pain has become even more common than heretofore. However, pain in the chest is frequently non-cardiac in origin. It may be the result of a neurogenic disturbance, but it may also be due to spondylitis, arthritis, neuritis, fibrositis, myositis, hiatus hernia, gallbladder disease, peptic ulcer and chronic lung disease.

Chest pain has usually been considered cardiac in origin if: (1) it was induced by effort; (2) its location was substernal; (3) it was constricting or oppressive in type; (4) it radiated into the left shoulder or arm; (5) it was of short duration; (6) it was relieved by nitroglycerine or cessation of exertion. On the other hand, non-cardiac chest pain has been assumed to have these characteristics: (1) occurrence at rest; (2) location in the left chest; (3) an aching character; (4) nonradiating; (5) of long duration; and (6) not relieved by nitroglycerin.

It is quite true that the majority of cases can be differentiated by these criteria, *but* a large number of exceptions occurs. Since many physicians often rely on a single criterion for diagnosis, these workers carried out a statistical study to determine the diagnostic value of each criterion. They investigated 100 patients with coronary disease and angina pectoris, all with abnormal electrocardiograms, and 100 patients with non-cardiac pain. They found that exceptions to the validity of the criteria outlined above ranged from 15 to 40%. For example, in one-fourth of the non-cardiac cases the pain was retrosternal and in one-third it was associated with exertion. In about one-third of the non-cardiac cases, the pain was relieved by nitroglycerin when this drug was employed repeatedly. On the other hand, in one-third of the patients with cardiac pain, this pain was located in the precordium or in the left chest, rather than in the retrosternal area. In 31% of the cardiac cases, the pain occurred at rest as well as on effort, and cardiac pain was not relieved by nitroglycerin in approximately 15% of the cases. It is concluded that none of the six characteristics hitherto accepted as diagnostic should be used *alone* to differentiate between cardiac and non-cardiac chest pain. However, when *three or more* of the characteristics of either cardiac or non-cardiac pain are present, a definite diagnosis can usually be made.

S. J. SHANE

Late Emergence of M. Tuberculosis in Liquid Cultures of Pulmonary Lesions Resected from Humans.

HOBBY, G. L. *et al.*: AM. REV. TUBERC., 70: 191, 1954.

Microbiological observations on 31 resected tuberculous lesions from 19 patients are reported herein. *M. tuberculosis* was recovered from 25 of the 31 lesions, or from 15 of the 19 patients. In the case of 9 of the 25 lesions from which viable tubercle bacilli were isolated by the cultural methods described, viability was first detected only after prolonged incubation for more than nine to twelve weeks. All strains of *M. tuberculosis* recovered from these lesions were highly virulent for guinea-pigs, although only 10 of the 25 lesions showing growth were capable of producing tuberculosis on direct inoculation into guinea-pigs.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

Fourteen of the 19 patients had received four to twelve months of chemotherapy preoperatively and showed morphological evidence of cavity closure. One had received 11 months of chemotherapy preoperatively and showed evidence of an open cavity with healing. Strains of *M. tuberculosis* were grown from 21 of the 27 "closed" or healed lesions from these 15 patients, or from 11 of the 15 patients. Although prolonged incubation was necessary for detection of viable tubercle bacilli in lesions from patients who had had repeated courses of chemotherapy, e.g., from "re-treatment" cases, no correlation was observed between the length of the preoperative course of chemotherapy or the period of preoperative noninfectiousness and the frequency with which viable tubercle bacilli were detected. Growth of *M. tuberculosis* was readily demonstrated on cultivation of 4 lesions from "control" patients who either had had no preoperative chemotherapy or had open cavities at the time of resection.

From the data presented, it is apparent that tubercle bacilli can survive in healed or semi-healed necrotic pulmonary lesions, even after prolonged chemotherapy, and that in many instances their viability can be demonstrated by appropriate cultural technique. S. J. SHANE

SURGERY

Missed Diagnoses in Head and Neck Tumours.

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A study of 370 patients seen at the Lahey Clinic with tumours of the head and neck during 1952-1953 revealed that previous diagnostic errors in this group could be to some extent classified. The commonest causes of errors and delay in diagnosis were as follows: failure to make a competent examination of the internal epithelial surfaces; misinterpretation of cervical adenopathy, with the diagnosis of infection instead of malignant disease; a lack of the appreciation of the seriousness of skin lesions; undue reliance on negative biopsy reports; and misinterpretation of thyroid enlargement. The successful treatment of head and neck tumours depends on early diagnosis and prompt, adequate treatment.

NORMAN S. SKINNER

Primary Skin-grafting in Proctological Surgery.

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Heavy contamination of anal wounds has made surgeons reluctant to close or graft them. But healing by granulation tissue and scar entails such a period of hospitalization and convalescence as to be out of proportion to the seriousness of the lesion. Primary suture is unpopular because of hæmatoma formation and infection. It is suggested that primary or delayed primary skin-grafting of the fresh wounds is a satisfactory method.

Such skin-grafting is described in 14 cases of fissure-in-ano, 3 cases of anal stenosis, 20 of low fissure-in-ano and 2 of ano-rectal fistula. The period of postoperative immobilization and convalescence was often shortened to a week or so and the result was reliable in a high proportion. The control of hæmorrhage must be meticulous. Split grafts usually came from the adjacent thigh.

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Experiments on dogs with a Heidenhain pouch and clinical observation lead to conclusions which differentiate the etiological factors of duodenal and gastric ulcer. Hypersecretion of gastric juice due to hyperfunction of the hormonal antrum mechanism leads to gastric ulcer, and gastroenterostomy may relieve by correcting the stasis and hypermobility present. Removal of the antrum even when the ulcer is in the cardia would also abolish the hormonal phase of secretion and thus be beneficial. Chronic gastric ulcers may develop in patients who have had a vagotomy and whose duodenal ulcer has been healed, but not in those whose vagotomy was accompanied by gastroenterostomy. Stoma ulcers are common after antrum resection or gastroenterostomy for duodenal ulcer, but not when this is done for gastric ulcer. Duodenal ulcers are due to hypersecretion of gastric juice of nervous origin and are not abolished by gastroenterostomy or antrum resection. The increased nocturnal gastric secretion of duodenal ulcer is of nervous origin and is not seen in gastric ulcer, for the antrum mechanism is quiescent in the empty stomach.

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Surgical procedures for the treatment of portal hypertension and of carcinoma in the upper abdomen, and accidental ligation of the hepatic artery during operations on the biliary tract, make experimental studies on the collateral circulation of the liver of interest. It has been shown that dogs may survive ligation of the hepatic artery if antibiotics are used. A three-stage procedure for ligating all branches of the hepatic artery and portal vein is described. Of the 29 dogs that underwent hepatic artery ligation and creation of a partial Eck fistula, the surviving 21 showed hæmorrhagic and lytic necrosis around the central vein. After the second operation to ligate the branches of the hepatic artery, 4 died. Of 11 dogs in whom the pancreaticoduodenal vein was also ligated, atrophy of the liver was marked. Studies of liver function are described following each stage. The development of collateral circulation and its significance are discussed. The curtailment of the blood supply to an organ is always damaging, but least when produced gradually.

BURNS PLEWES

Special Significance of Concomitant Gastric and Duodenal Ulcers.

JOHNSON, H. D.: LANCET, 1: 266, 1955.

Among 311 patients operated on for peptic ulcer 29 had lesions of both stomach and duodenum. This is a curious fact, in that duodenal ulcer develops in a hypersecreting, hypertonic stomach while gastric ulcer is associated with a hyposecreting, sluggish stomach; the author therefore studied his 29 cases in greater detail, in addition to another 90 found by colleagues.

In 79 out of 85 cases the duodenal ulcer was discovered first; in most cases there was hypersecretion of acid, and in a number of instances a high total acidity was associated with low free acid, suggesting gastric retention. Further study showed that 64% of patients with concomitant ulcers unquestionably had gastric retention. It would seem that gastric retention is a main cause of concomitant gastric ulcer, and that one out of every six patients hospitalized for pyloric stenosis has already developed a gastric ulcer.

The commonest finding at operation was of an active gastric ulcer with a healed, scarred, often stenosed duodenal lesion. With coexisting ulcers, the risk to the patient is greater than the sum of the risks from either ulcer alone. In treatment, the presence of gastric retention must be remembered; special preoperative measures may therefore be needed. The common finding of hypersecretion indicates the need for an operation adequate to control this factor in these cases, which should always be subjected to early operation.

Giant Fibroadenoma of the Breast: Cystosarcoma Phyllodes.

SILVERSTONE, M.: BRIT. J. SURG., 41: 606, 1954.

Cystosarcoma phyllodes is an uncommon lesion of the breast, about 250 cases having been reported. Müller described this giant fibroadenoma in 1838. It is benign, but may take on malignant characters. Microscopically the fibroadenoma shows overgrowth of stroma fibroblasts and fibrocytes with areas of collagen. In the soft gelatinous areas in the otherwise hard irregular tumour there is mucoid adenomatous stroma. Hyperplasia of epithelium is varied and squamous metaplasia occurs. When malignancy supervenes it is in the connective tissue element. Treatment is by simple mastectomy. BURNS PLEWES

Total Gastrectomy for Gastric Cancer: Effect Upon Mortality, Morbidity, and Curability.

MARSHALL, S. F. AND URAM, H.: SURG., GYNEC. & OBST., 99: 657, 1954.

Any improvement in cure rate for gastric carcinoma depends on early recognition of the lesion, and on the development of methods of prevention. Polyps should be regarded as precursors of this disease (35% are malignant); 10-15% of so called benign gastric ulcers prove malignant; a family history of gastric carcinoma calls for closer investigation of the patient, as does the presence of pernicious anæmia.

The present group of 202 total gastrectomies performed at the Lahey Clinic, Boston, included 184 for malignant neoplasms; 61% of the patients were men. Epigastric pain and discomfort, anorexia and nausea were common early symptoms in these cases. Delay in treatment was ascribed to the physician in 70 cases; 54 patients had had symptoms for over 12 months before a definite diagnosis was made. Achlorhydria was common; anæmia was not. Lymph node involvement was just as common in adenocarcinoma as in less differentiated tumours.

The authors consider that total gastrectomy should be performed only in those cases in which there is a reasonable chance of removing all carcinomatous tissue. They find an abdominal (left transrectus) incision most satisfactory, with extension by cutting across the costochondral arch into the fifth or sixth interspace if necessary. An entero-enterostomy is always performed to form a food pouch; the cæcum or transverse colon is never used for this. Splenectomy is performed as a routine.

Mortality for 1927-43 for total gastrectomy was 34.6%, but has since been reduced to 8.7%. Of the 149 patients who survived operation, 39 lived three years or more, and 21 lived five years or more. The effect of lymph node involvement on prognosis was significant. Survival rate was much better after gastrectomy for sarcoma than after the operation for carcinoma. Apart from the bad prognosis in prepyloric and diffuse gastric carcinoma, the site of the tumour did not affect the outcome.

Total gastrectomy is not recommended as a routine in all cases of gastric cancer. S.G.

Intussusception: An Eight-Year Survey.

ROOT, G. T., CHRISTENSEN, B. H. AND PETERSON, C. A.: SURG., GYNEC. & OBST., 100: 171, 1955.

Sixty-six consecutive proven cases of intussusception are reviewed. The operative mortality was only 3% (two cases). A third death occurred in an advanced case not submitted to operation. Most children were under two years and two-thirds were males. The onset in six cases was associated with acute gastroenteritis. Barium enema was a decided diagnostic help in these instances. It also clinched the diagnosis in the 21 others where it was used. In four cases the enema reduced the intussusception fully, and in four cases partially. The authors note that Ravitch reported 73.6% reduction by barium enema in 57 cases at Johns Hopkins, with no deaths. Its use for this purpose was not relied on in this series, as it was felt important to establish the viability of the bowel and associated structures like the appendix and Meckel's diverticulum at operation.

Duration of symptoms was under 24 hours in 44% and none of these required bowel resection. In 47% the symptoms had been present over 48 hours and one-fourth of these needed resection. In the 15 cases where the intussusception involved the left half of the colon, the resection rate of 20% was double that in the other 51 cases. None of the eight patients who underwent resection died.

The operative procedure was usually a simple reduction, but in 15% the terminal ileum was tacked to cæcum and ascending colon. A Meckel's diverticulum was removed in six cases (four acute) and 29 appendectomies were done (18 acute). ALLAN D. POLLOCK

Age Factor in Mortality Rate of Patients Undergoing Biliary Tract Surgery.

GLENN, F. AND HAYS, D. M.: SURG., GYNEC. & OBST., 100: 11, 1955.

It is becoming increasingly a fashion to accept older individuals for operation upon the biliary tract. A study has been made at the New York Hospital of the results of such surgery in patients of various age groups. The total series numbers 4,050, so that a sufficient number in each age group are present for valid analysis. The authors find that in older people with biliary tract disease there is an increased incidence of acute cholecystitis, an increased incidence of stone in the common duct, a tendency for acute disease to be masked by development of few symptoms and an increased incidence of tumour. Nevertheless, the difference in mortality after elective operations on the various age groups is not significant. Age is no bar to operation for acute cholecystitis.

OBSTETRICS AND GYNÆCOLOGY

Post-puerperal Recurrent Depression.

HEGARTY, A. B.: BRIT. M. J., 1: 637, 1955.

A syndrome is described in which recurrent depression, irritability and tension dating from an attack of mild but typical puerperal depression are the leading features. The syndromes tend to be worse in the premenstrual phase. A pyknic body-build appears to be typical. The condition follows a chronic course, and treatment is problematical. Serious disturbance of the life of the family is a secondary effect of the illness. The condition appears to be related to the premenstrual tension syndrome. It is a common and important condition and is at present insufficiently recognized. ROSS MITCHELL

Approach to the Delivery of the Hyperextended Fetus.

AMIEL, G. J.: J. OBST. & GYNÆC. BRIT. EMP., 42: 102, 1955.

A case is described, with radiographs, in which persistent hyperextension in a fetus was overcome by the forces of labour and allowed of a spontaneous vertex delivery. The finding of a spina bifida of the atlas is reported. Other cases in the literature are briefly reviewed, and conclusions as to method of approach to the problem of delivery of the hyperextended fetus are drawn.
ROSS MITCHELL

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Total Gastrectomy for Gastric Cancer: Effect Upon Mortality, Morbidity, and Curability.

MARSHALL, S. F. AND URAM, H.: SURG., GYNEC. & OBST., 99: 657, 1954.

Any improvement in cure rate for gastric carcinoma depends on early recognition of the lesion, and on the development of methods of prevention. Polyps should be regarded as precursors of this disease (35% are malignant); 10-15% of so called benign gastric ulcers prove malignant; a family history of gastric carcinoma calls for closer investigation of the patient, as does the presence of pernicious anæmia.

The present group of 202 total gastrectomies performed at the Lahey Clinic, Boston, included 184 for malignant neoplasms; 61% of the patients were men. Epigastric pain and discomfort, anorexia and nausea were common early symptoms in these cases. Delay in treatment was ascribed to the physician in 70 cases; 54 patients had had symptoms for over 12 months before a definite diagnosis was made. Achlorhydria was common; anæmia was not. Lymph node involvement was just as common in adenocarcinoma as in less differentiated tumours.

The authors consider that total gastrectomy should be performed only in those cases in which there is a reasonable chance of removing all carcinomatous tissue. They find an abdominal (left transrectus) incision most satisfactory, with extension by cutting across the costochondral arch into the fifth or sixth interspace if necessary. An entero-enterostomy is always performed to form a food pouch; the cæcum or transverse colon is never used for this. Splenectomy is performed as a routine.

Mortality for 1927-43 for total gastrectomy was 34.6%, but has since been reduced to 8.7%. Of the 149 patients who survived operation, 39 lived three years or more, and 21 lived five years or more. The effect of lymph node involvement on prognosis was significant. Survival rate was much better after gastrectomy for sarcoma than after the operation for carcinoma. Apart from the bad prognosis in prepyloric and diffuse gastric carcinoma, the site of the tumour did not affect the outcome.

Total gastrectomy is not recommended as a routine in all cases of gastric cancer. S.G.

Intussusception: An Eight-Year Survey.

ROOT, G. T., CHRISTENSEN, B. H. AND PETERSON, C. A.: SURG., GYNEC. & OBST., 100: 171, 1955.

Sixty-six consecutive proven cases of intussusception are reviewed. The operative mortality was only 3% (two cases). A third death occurred in an advanced case not submitted to operation. Most children were under two years and two-thirds were males. The onset in six cases was associated with acute gastroenteritis. Barium enema was a decided diagnostic help in these instances. It also clinched the diagnosis in the 21 others where it was used. In four cases the enema reduced the intussusception fully, and in four cases partially. The authors note that Ravitch reported 73.6% reduction by barium enema in 57 cases at Johns Hopkins, with no deaths. Its use for this purpose was not relied on in this series, as it was felt important to establish the viability of the bowel and associated structures like the appendix and Meckel's diverticulum at operation.

Duration of symptoms was under 24 hours in 44% and none of these required bowel resection. In 47% the symptoms had been present over 48 hours and one-fourth of these needed resection. In the 15 cases where the intussusception involved the left half of the colon, the resection rate of 20% was double that in the other 51 cases. None of the eight patients who underwent resection died.

The operative procedure was usually a simple reduction, but in 15% the terminal ileum was tacked to cæcum and ascending colon. A Meckel's diverticulum was removed in six cases (four acute) and 29 appendectomies were done (18 acute). ALLAN D. POLLOCK

Age Factor in Mortality Rate of Patients Undergoing Biliary Tract Surgery.

GLENN, F. AND HAYS, D. M.: SURG., GYNEC. & OBST., 100: 11, 1955.

It is becoming increasingly a fashion to accept older individuals for operation upon the biliary tract. A study has been made at the New York Hospital of the results of such surgery in patients of various age groups. The total series numbers 4,050, so that a sufficient number in each age group are present for valid analysis. The authors find that in older people with biliary tract disease there is an increased incidence of acute cholecystitis, an increased incidence of stone in the common duct, a tendency for acute disease to be masked by development of few symptoms and an increased incidence of tumour. Nevertheless, the difference in mortality after elective operations on the various age groups is not significant. Age is no bar to operation for acute cholecystitis.

OBSTETRICS AND GYNÆCOLOGY

Post-puerperal Recurrent Depression.

HEGARTY, A. B.: BRIT. M. J., 1: 637, 1955.

A syndrome is described in which recurrent depression, irritability and tension dating from an attack of mild but typical puerperal depression are the leading features. The syndromes tend to be worse in the premenstrual phase. A pyknic body-build appears to be typical. The condition follows a chronic course, and treatment is problematical. Serious disturbance of the life of the family is a secondary effect of the illness. The condition appears to be related to the premenstrual tension syndrome. It is a common and important condition and is at present insufficiently recognized. ROSS MITCHELL

Approach to the Delivery of the Hyperextended Fetus.

AMIEL, G. J.: J. OBST. & GYNÆC. BRIT. EMP., 42: 102, 1955.

A case is described, with radiographs, in which persistent hyperextension in a fetus was overcome by the forces of labour and allowed of a spontaneous vertex delivery. The finding of a spina bifida of the atlas is reported. Other cases in the literature are briefly reviewed, and conclusions as to method of approach to the problem of delivery of the hyperextended fetus are drawn.
ROSS MITCHELL

Canad. M. A. J.
Aug. 1, 1955, vol. 73

Cancer of the Cervix in Jewish Women.

OBER, W. B. AND REINER, L.: NEW ENGLAND J. MED., 251: 555, 1954.

Carcinoma of the cervix uteri has previously been reported as of less frequent occurrence among Jewish women than among Gentiles. The authors review this literature and also present a study of the hospital records of the Beth Israel Hospital, Boston, covering the period 1928-1953, showing that cancer of the cervix was nine times as frequent among the non-Jewish women admitted to the hospital during this period. There was no significant racial difference between the incidences of cancer of the body of the uterus in the two groups.

NORMAN S. SKINNER

THERAPEUTICS

Clinical Studies of an Anti-emetic Agent, Chlorpromazine.

MOYER, J. H., *et al.*: AM. J. M. SC., 228: 174, 1954.

Chlorpromazine has been shown in animals to protect against apomorphine-induced emesis and motion sickness, by depression of the vomiting reflex site within the central nervous system.

In this study the authors selected 306 patients in whom the diagnosis and cause of the vomiting had been reasonably well established and in whom vomiting was a definite therapeutic problem. The adult patients were given 10, 25 or 50 mgm. doses of the drug by either the oral or intramuscular route, and the dose was repeated at varying intervals as frequently as necessary to control the symptoms. The therapeutic efficacy was reported as excellent in those cases in which vomiting stopped and the nausea was completely relieved, good in those cases in which the vomiting stopped but the patient remained slightly nauseated, and fair in those cases in which vomiting stopped but nausea continued; failure was also recorded. Placebos were substituted whenever there was a question as to psychic versus drug effect in the acute studies. Nausea and vomiting were controlled in many of the patients after several doses of the drug, and therefore they did not require prolonged administration. Fifty-five patients continued to take chlorpromazine for five days or more; placebos were substituted periodically in these cases. Before and during administration of chlorpromazine the patient's pulse rate and blood pressure were recorded. During this time the patient was also observed for evidence of sedation, dizziness, dryness of the mouth, and other significant side-reactions.

Chlorpromazine was found to be effective for drug-induced nausea and vomiting; in contrast to laboratory findings, it was highly effective in arresting nausea and vomiting due to digitalis intoxication. In 38 patients being treated with nitrogen mustard, chlorpromazine failed to arrest the nausea and vomiting in only two instances; four additional patients remained quite nauseated but did not vomit, and eight experienced nausea intermittently. Two patients with nausea and vomiting due to quinidine administration were treated without complete relief. However, chlorpromazine proved to be effective for controlling the nausea and vomiting due to gastric irritation associated with aminophylline and antibiotic administration, and was very effective in combating nausea and vomiting associated with morphine administration. Chlorpromazine appeared to be an effective anti-emetic in nausea and vomiting due to infections and toxic reactions from non-infectious systemic diseases, and very effective in a minor epidemic of gastroenteritis, but concurrent manifestations, such as weakness and diarrhœa, were not affected. Nausea and vomiting associated with cardiovascular disease (congestive heart failure) were relieved in all of seven cases.

Nausea and vomiting associated with peptic ulcer were relieved in six of nine patients. The authors warn that the vomiting associated with intestinal obstruction is frequently blocked by chlorpromazine; a diagnosis should therefore be clearly established before this drug is administered. Chlorpromazine is valuable to the anæsthetist, nausea and vomiting after general anæsthesia being relieved in all cases tested. The drug also blocked retching associated with traction of the omentum under spinal anæsthesia. Nausea and vomiting associated with Ménière's syndrome appeared to be controlled, but there was no effect on the dizziness. Nausea and vomiting of pregnancy responded very well to chlorpromazine; of 78 patients tested, 55 obtained complete relief, and only four were complete failures; the sedative effect of the drug could be controlled in most instances by giving 5-10 mgm. of Dexedrine concurrently. The minimal effective dose of chlorpromazine for the nausea and vomiting of pregnancy appeared to be 25 mgm., but many patients responded to 10 mgm.

Of the 306 patients studied, 47% developed varying degrees of sedation, 24% dizziness, 19% dryness of the mouth, 14% tachycardia and 12% a reduction in blood pressure. The sedation produced in the majority of cases was very mild, and would not have interfered with the patient's normal activity. However, a few patients were quite drowsy and two could not be awakened after 50 mgm. doses intramuscularly. Sedation was most marked during the initial treatment, and usually subsided to a considerable degree with continued administration. A few patients experienced syncope in the upright position, but this was corrected when the patient remained supine. The dryness of the mouth was very mild. When tachycardia occurred, the pulse rate usually increased by 10 to 20. A slightly greater percentage of patients had side-effects from the drug when it was given intramuscularly than when it was given orally, sedation being the most common side-effect.

Fifty-five patients received chlorpromazine for periods from five days to three months. Control of nausea and vomiting was excellent in 55%, good in 31% and fair in 13%, with one failure. The drug was also very useful for the treatment of intractable hiccup, which was arrested within 20 minutes of intramuscular administration of 25 mgm. of chlorpromazine in six patients, after a second dose in two others; in two others the drug was ineffective. There is no evidence that the drug has any untoward effects, although one out of over 500 patients developed jaundice without laboratory evidence of hepatocellular damage.

W. F. T. TATLOW

Oral Metrazol Therapy in Psychotic Senile and Arteriosclerotic Patients.

GROSS, M. AND FINN, M.: J. AM. GERIATRIC SOC., 2: 514: 1954.

The senile arteriosclerotic patient confined to a mental institution generally has two groups of symptoms. First, he is confused and disorientated and has severe memory defects; secondly, he has committed or threatened to commit acts not acceptable to the community. The authors investigated particularly changes in intellectual and psychological functions, and behaviour changes occurring under the influence of metrazol medication. Standard psychological testing procedures were used for the following functions: interpersonal relationships, memory, associative ability, body image, everyday information, self-concept, contact with reality and ability to abstract. The behaviour of the patients was observed on the ward by two charge attendants who checked each patient every two weeks against a behaviour rating scale.

The authors investigated ten patients; in six the diagnosis was senile psychosis, and in four psychosis with cerebral arteriosclerosis; there were five controls. The most constant symptoms in the patients with senile psychosis were confusion and disorientation. The patients were given 0.1 gm. of metrazol orally three or four

times daily for a period of six to 11 weeks. Then a further period of metrazol at a dosage of 0.6 to 0.8 gm. daily was given for two to three weeks; maximal dosage of 0.9 to 1.2 gm. was then given for a period of three to five weeks. Total time of therapy varied from 11 to 18 weeks, and no other medication was given. The physical condition of the patients was checked before metrazol was initiated, and thereafter at intervals of about two weeks. In the control series, five patients selected from the same ward were given placebos; the attendants were not aware that the control group existed and thought that metrazol was being tested in two different forms.

Metrazol was well tolerated by all patients up to a dose of 0.9 gm. daily. When the dosage was increased to 1.2 gm. daily, two patients complained of weakness. One of them became cyanotic and had palpitations; the other became unsteady on his feet and acted as if he were under sedation. In these two patients, as well as in a third patient who became increasingly confused and aggressive, medication was discontinued. On behaviour rating the results were rather poor. On psychological testing the test used did not appear to be very sensitive for this type of patient (severely senile, aged and disturbed psychotics) and it was practically impossible to determine fatigue and mood from the meagre test results. The authors found that their results were less favourable than the results of most other observers. This might be due to the fact that they were dealing with severely deteriorated patients in whom the brain was damaged to such an extent that functional improvement could no longer be obtained. Another reason might be that there was careful checking of all patients on a daily basis by observers who spent at least eight hours daily with them. The authors considered that the most important fact, however, was that oscillations in the behaviour and mentation of senile and cerebral arteriosclerotic patients do occur spontaneously. The authors felt that some of the changes in their experimental group might have been spontaneous and not necessarily due to metrazol medication.

W. F. T. TATLOW

INDUSTRIAL MEDICINE

Trial of Hexylresorcinol as Air Disinfectant for Prevention of Colds in Office Workers.

LIDWELL, O. M. AND WILLIAMS, R. E.: BRIT. M. J., 2: 959, 1954.

That hexylresorcinol had no detectable effect on the bacterial content of the air, on the number of colds recorded by the staff or on the absence rate was evident from the carefully controlled trial reported in this article. In 1942 hexylresorcinol was recommended for use as an air disinfectant. Several subsequent investigations corroborated this opinion. In the winter of 1952-3, however, the test carried out by the authors of this article ended in failure.

The test was carried out in eight offices of the then Ministry of National Insurance in Newcastle-upon-Tyne. Each was of about 26,000 cu. ft. capacity and had about 45 staff, similarly distributed in respect of age, sex and status. Preliminary observations during the winter of 1951-2 had shown that the attack rates of colds among the staff in each of six similar rooms were almost equal, the room attack rates varying from 4.5 to 6.2 per 100 person-weeks of exposure.

Details are given regarding the methods followed in the investigation and the results of the test. Hexylresorcinol was vaporized by heat at the rate of about 0.125 gm. an hour into three of the rooms, the rate recommended from past experience by the manufacturers of the apparatus used. The other five rooms were observed as controls; three of them had dummy vaporizers. A nurse visited each member of the staff once a week over the period of 38 weeks. In this way the number of colds suffered in both the treated and untreated rooms was recorded. Air samples for bacteriological analysis were collected on four occasions during the winter.

Analysis of the data obtained during this study indicated no detectable effect from the use of hexylresorcinol. Moreover, a short test made subsequently in July 1953, using a higher concentration of the bactericide, suggested that no great effect on the bacterial content of the air could be obtained without risk of respiratory tract irritation from the hexylresorcinol.

MARGARET H. WILTON

Raynaud's Phenomenon . . . Report of the Industrial Injuries Advisory Council in accordance with Section 61 of the National Insurance (Industrial Injuries) Act, 1946, on the question whether Raynaud's phenomenon should be prescribed under the Act.

LONDON, H.M.S.O., 1954.

Under the Industrial Injuries Act, benefit is provided in the U.K. for injuries arising out of and in the course of employment and for certain diseases due to the nature of employment ("prescribed diseases"). In 1946 a workman had contracted Raynaud's phenomenon through the use of an electrically operated rapidly rotating fettling tool. Under the Workmen's Compensation Acts, the Court of Appeal had awarded him compensation for an injury by accident arising out of and in the course of his employment. Subsequent cases gave rise to doubt concerning this decision. In 1949 in another case a tribunal consisting of the Industrial Injuries Commissioner and two Deputy Commissioners disallowed the claim, on the contention that the claimant's incapacity was the result not of an injury by accident but of a continuous process. Following this the Minister of Pensions and National Health, on March 21, 1950, requested the Industrial Injuries Advisory Council to consider the advisability of bringing Raynaud's phenomenon within the cover of the Act by adding it to the list of prescribed diseases. The Council referred the matter to their Industrial Diseases Sub-Committee for full investigation, the result of which is presented. That Raynaud's phenomenon should not be prescribed was the decision in the majority report.

In the course of their enquiry the Industrial Diseases Sub-Committee gave careful consideration to oral evidence, to that revealed by all available literature on the subject and to the results of a survey conducted during 1953 by the Occupational Health Committee of the Medical Research Council. In arriving at their conclusion they encountered many significant obstacles, which they discuss in detail under the following heads: (a) The difficulty of distinguishing between occupational and non-occupational cases. (b) The difficulty of deciding and defining the occupational coverage to be given. (c) The problems of diagnosing the condition and assessing the disablement resulting from it. (d) The triviality of the disablement in the great majority of cases.

After considering all the factors together, the majority of the Sub-Committee concluded that Raynaud's phenomenon rarely interferes to any marked extent with the patient's work. In their opinion, any form of prescription of Raynaud's phenomenon would give rise to serious practical difficulties, both in defining the coverage and in deciding individual claims. Decisions would often have to be given on inadequate evidence, and different adjudicating authorities could be expected to arrive at different conclusions on cases presenting similar facts. Furthermore, the total amount of benefit ultimately payable would be comparatively small. They therefore advise against its prescription either for the whole field of workers exposed to vibration or for a more limited group.

In contrast, the minority of the Sub-Committee recommend the inclusion of Raynaud's phenomenon as a prescribed disease. They point to the practice in a number of other countries where it is compensated as an industrial disease. In their opinion further investigation is warranted.

MARGARET H. WILTON

FORTHCOMING MEETINGS

CANADA

CANADIAN PUBLIC HEALTH ASSOCIATION AND ALBERTA PUBLIC HEALTH ASSOCIATION, Conjoint Meeting, Edmonton, Alta. (Dr. William Mosley, Honorary Secretary, 150 College Street, Toronto 5, Ont.) September 6-8, 1955.

CANADIAN SOCIETY FOR THE STUDY OF FERTILITY, Royal York Hotel, Toronto, Ont. (Dr. Earl R. Plunkett, Secretary Treasurer, Canadian Society for the Study of Fertility, 469 Waterloo Street, London, Ont.) October 6-8, 1955.

UNITED STATES

ANNUAL ASSEMBLY IN OTOLARYNGOLOGY, University of Illinois College of Medicine, 1853 West Polk Street, Chicago 12, Illinois. (Dr. F. L. Lederer, Professor and Head of the Department.) September 19-October 1, 1955.

AMERICAN MEDICAL WRITERS' ASSOCIATION, 12th Annual Meeting, Hotel Jefferson, St. Louis, Missouri. (Dr. H. Swanberg, Secretary, 209-224 W.C.U. Bldg., Quincy, Ill.) September 30, 1955; Workshop, October 1, 1955.

MIDWEST CONFERENCE ON RHEUMATIC DISEASES, Henry Ford Hospital, Detroit, Michigan. (Dr. J. Lightbody, Medical Director, Michigan Chapter, Arthritis & Rheumatism Foundation, 7338 Woodward Avenue, Detroit 2, Michigan.) October 5, 1955.

ANNUAL MEETING OF THE AMERICAN ACADEMY FOR CEREBRAL PALSY, Memphis, Tennessee. (Dr. R. A. Knight, Secretary-Treasurer, 869 Madison Avenue, Memphis 3, Tenn.) October 10-12, 1955.

AMERICAN HEART ASSOCIATION, Annual Meeting and Twenty-Eighth Annual Scientific Session, Jung Hotel, New Orleans, Louisiana. (The Medical Director, American Heart Association, 44 East 23rd Street, New York 10, N.Y.) October 22-26, 1955.

INTERNATIONAL ANÆSTHESIA RESEARCH SOCIETY CONGRESS, Washington, D.C. (Dr. William Friend, 515 Nome Avenue, Akron, Ohio.) October 24-27, 1955.

INTER-SOCIETY CYTOLOGY COUNCIL, 3rd Annual Meeting, Statler Hotel, Cleveland, Ohio. (Dr. P. F. Fletcher, Secretary-Treasurer, 634 N. Grand Blvd., St. Louis 3, Mo.) November 11-12, 1955.

AMERICAN PUBLIC HEALTH ASSOCIATION, INC., 83rd Annual Meeting and Meetings of Related Organizations, Kansas City, Missouri. (The American Public Health Association, Inc., 1790 Broadway, New York 19, N.Y.) November 14-18, 1955.

NATIONAL SOCIETY FOR CRIPPLED CHILDREN AND ADULTS, Annual Convention, Palmer House, Chicago. (Director of Information, 11 South LaSalle Street, Chicago 3, Illinois.) November 28-30, 1955.

AMERICAN PSYCHOSOMATIC SOCIETY, 13th Annual Meeting, Sheraton Plaza Hotel, Boston. (Dr. S. Cobb, Chairman, Programme Committee, 551 Madison Avenue, New York 22, N.Y.) March 24-25, 1956.

SIXTH INTERNATIONAL CONGRESS OF OTOLARYNGOLOGY, Washington, D.C. (Dr. Paul H. Holinger, Secretary-General, 700 North Michigan Ave., Chicago 11, Ill.) May 5-10, 1957.

OTHER COUNTRIES

CENTRAL COUNCIL FOR HEALTH EDUCATION—Summer School, Neuadd Reichel, Wales. (Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1.) August 16-26, 1955.

SYMPOSIUM NEURORADIOLOGICUM, The National Hospital, Queen Square, London, England. (Dr. R. D. Hoare, Secretary.) September 13-17, 1955.

4TH INTERNATIONAL CONGRESS OF LEGAL AND SOCIAL MEDICINE, Genoa, Italy. (Secretariat, Académie Internationale de Médecine Légale et Sociale, Via de Toni, Genoa.) October 13-17, 1955.

AUSTRALASIAN MEDICAL CONGRESS (B.M.A.)—9th Session, Sydney, Australia. (Dr. J. G. Hunter, B.M.A. House, Macquarie Street, Sydney.) August 20-27, 1955.

ANNUAL MEETING OF THE WORLD FEDERATION FOR MENTAL HEALTH, Istanbul. (Miss E. M. Thornton, W.F.M.H., 19 Manchester Street, London, W.1.) August 21, 1955.

CONGRÈS DE LA LITHIASE URINAIRE, Evian (Hte-Savoie), France. (Séc. Prof. Agr. Cl. Laroche, 16, rue Christophe-Colomb, Paris 8e, France.) September 2-4, 1955.

SECOND INTERNATIONAL CONGRESS OF ANGIOLOGY AND HISTOPATHOLOGY. Fribourg, Switzerland. (Dr. Gerson, 4 rue Pasquier, Paris 8e.) September 2-5, 1955.

WORLD CONGRESS OF ANÆSTHESIOLOGISTS, Scheveningen, Netherlands. (W. A. Fentener van Vlissingen, Noord-Houdringelaan, 24, Bilthoven.) September 5-10, 1955.

INTERNATIONAL CONGRESS OF CRIMINOLOGY, London, England. (Dr. Carroll, 28 Weymouth Street, London, W.1.) September 11-18, 1955.

INTERNATIONAL CONGRESS OF NEUROPATHOLOGY, London, England. (Dr. W. H. McMenemy, Maida Vale Hospital, London, W.9.) September 12-17, 1955.

GENERAL ASSEMBLY, INTERNATIONAL PHARMACEUTICAL FEDERATION, London, England. (Pharmaceutical Society of Great Britain, c/o Mr. D. F. Lewis, 17 Bloomsbury Square, London, W.C.1.) September 19-23, 1955.

GENERAL ASSEMBLY OF THE WORLD MEDICAL ASSOCIATION, Vienna. (Dr. L. H. Bauer, Secretary-General, 345 E. 46th Street, New York 17, N.Y.) September 20-26, 1955.

UNITED NATIONS CONGRESS ON THE PREVENTION OF CRIME AND THE TREATMENT OF OFFENDERS, Geneva, Switzerland. (U.N. Information Centre, Russell Square House, Russell Square, London, W.C.1.) September 22-23, 1955.

CONGRESS OF FRENCH-SPEAKING SOCIETIES OF GYNÆCOLOGY AND OBSTETRICS, Brussels. (Dr. Vokaer, 309 avenue Molière, Brussels.) September 22-24, 1955.

FIRST INTERNATIONAL CONGRESS OF MEDICAL ETHICS (Premier Congrès International de Juridiction Professionnelle Médicale et de Droit Médical Comparé), Paris. (Congress Secretary: Conseil National de l'Ordre des Médecins, 60 Boulevard Latour-Maubourg, Paris 7e). September 30, October 1-3, 1955.

PAN-AMERICAN CONGRESS, International Congress of Surgeons (in conjunction with Argentine conference on thoracic surgery), Mendoza, Argentina. (Biblioteca, Asociacion Medica Argentina, Santa Fé 1171, Buenos Aires, Argentina.) October 22-26, 1955.

CONGRESS OF THE INTERNATIONAL UNION OF THE MEDICAL PRESS, Paris, France. (Jean Mignon, Secretary-General, "Le Concours Médical," 37 rue de Bellefond, Paris 9e.) October 16-20, 1955.

INTERNATIONAL CONGRESS OF ALLERGOLOGY, Rio de Janeiro, (Dr. F. W. Wittich, 424 LaSalle Medical Bldg., Minneapolis, Minn.) November 6-12, 1955.

SECOND WORLD CONGRESS OF THE INTERNATIONAL FERTILITY ASSOCIATION, Naples, Italy. (Prof. G. Tesauro, President of Committee Arrangements, S. Andrea delle Dame, 19, Naples.) May, 1956.

INTERNATIONAL CONGRESS AGAINST ALCOHOLISM, Istanbul, Turkey. (International Bureau Against Alcoholism, Case Gare 49, Lausanne, Switzerland.) September 10-15, 1956.

NEWS ITEMS

BRITISH COLUMBIA

The Annual Summer School of the Vancouver Medical Association, held in Vancouver from June 6 to 10 inclusive, was a most successful affair. The meetings were held in Stanley Park Pavillion, and while this was a new departure—the Hotel Vancouver having always hitherto being chosen for this purpose—it appears to have been a very wise move on the part of the committee in charge. The weather was cool, to be sure, and it was not altogether free from rain, but the arrangements were excellent, and everybody enjoyed the surroundings.

The programme was excellent, too. It was a matter of keen regret that Professor Ian Aird, of London, England, was not able to attend; circumstances beyond his control prevented this at the last minute. But his place was admirably filled by three surgical specialists from Seattle, Drs. Charles Moen, David Metheny, and Allan Lobb. The generosity of these kind neighbours of ours, who came at such short notice, was greatly appreciated, and the material of their lectures and addresses was of the highest order.

Over 200 attended the School, and many brought their ladies. A most successful dinner and dance was held in the Thunderbird Room of the Capilano Canyon Hotel, and a golf tournament was held on Thursday.

Dr. E. D. Felsted, till now a member of the radiology department of the Vancouver General Hospital, has been appointed Assistant Professor of Medicine at the University of Oregon, and leaves Vancouver shortly to take up his new position.

On June 29, the new six-floor wing of St. Paul's Hospital, Vancouver, was officially opened. The wing is immediately adjacent to the north arm of the hospital, and its top floor opens into the surgical floor of the hospital. The new top floor will provide 11 additional operating rooms, and the whole will be one continuous operating area. The latest and most complete arrangements for x-ray and pathological examinations will be provided, and an auditorium with room for 380 people has been built. This auditorium is designed for viewing televised operations, where the surgeon will be heard as well as seen, as he operates, from special galleries.

The wing also provides new clinic rooms and classrooms for research, study and teaching, while three floors will accommodate resident graduate and student nurses. This specially designed building will be extremely useful from a teaching standpoint.

Through its President, Dr. F. A. L. Mathewson, the Defence Medical Association of Canada announces the winning by a Vancouver medical unit of the Ryerson Trophy, awarded annually to the army medical unit with the highest standard for performance and efficiency in military medical practice. The competition is among units all over Canada, and the inspection of officers and men in the finals was conducted by Lt.-Col. John Barr.

The winning Company was the 24th Medical Company, R.C.A.M.C., commanded by Major C. E. Robinson.

It is with regret that we announce that Mrs. Dewest, of the staff of the library of the Vancouver Medical Association, is leaving us. Her husband, owing to business exigencies, is leaving Vancouver, and she is accompanying him.

Mrs. Dewest has been a most valued worker on the staff for some years, and has been particularly concerned in the business end of the work of the Association. Your reporter is especially sad over her departure, since she was his right hand in the work of the Bulletin. We wish her every success and prosperity.

J. H. MACDERMOT

SASKATCHEWAN

The seventh annual meeting of the Saskatchewan Surgical Society was held in Regina on May 28 and 29, with over 85 Saskatchewan surgeons in attendance. The committee consisted of Drs. B. C. MacRae, S. Young, E. W. Barootes and A. C. Taylor, entertainment and arrangements being supervised by Dr. J. D. Leishman.

The programme was initiated by an excellent panel discussion on "Cardiac Arrest" with Drs. C. H. Crosby, E. T. French, Jr., F. McAlpine, and J. Grant McFetridge as members. Professor H. Rocke Robertson, Professor of Surgery, University of British Columbia, spoke on "Observations on Venous Thrombosis."

In the afternoon of the first day Dr. L. H. McConnell discussed his experiences with prefrontal lobotomy. He was followed by Dr. E. F. Routley, speaking on "Surgery of the Adrenals," Professor E. M. Nanson, Professor of Surgery, University of Saskatchewan, on "Surgery of Portal Hypertension," and Dr. J. C. McCarroll on "Chronic Endocervicitis."

On Sunday, May 29, a panel discussion on "Electrolyte and Fluid Balance in Surgery" took place with Drs. F. H. Wigmore, L. H. Crimp, M. G. Israels and F. C. Dobie as members of the panel. Dr. H. Rocke Robertson spoke on "Carcinoma of the Thyroid," Dr. E. A. Jones on "Painful Shoulder Syndromes," Dr. H. R. McIntyre on "Non-union of Fractures in Paget's Disease," and Dr. T. H. C. Barclay on "Carcinoma of the Stomach."

On Saturday evening the members of the Surgical Society were guests of the Regina surgeons at the Assiniboia Club, where the guest speaker was Dr. F. D. Munroe who discussed "Medical Practice in Saskatchewan—Past and Present."

A limited number of bursaries for postgraduate training in medical social work are being made available through the Saskatchewan Department of Public Health. The bursaries, open to anyone with a B.A. degree from a recognized university, cover expenditures up to a minimum for each candidate of $1,750 to $2,000.

The Hon. T. J. Bentley, Minister of Public Health, has recently announced that the Government of Saskatchewan will begin the immunization of all residents of the province up to the age of 34 years with the Salk polio vaccine. This vaccine will be furnished free of charge as are other vaccines and serums, and administration will be arranged through local health authorities.

In the organized health regions and in the cities of Saskatoon and Regina it is hoped that administration can form part of the regular immunization programme, the Minister said. He also noted that in an area not presently organized into health regions it will be necessary to consider alternative ways of administering the vaccine; plans are not yet completed.

N. MCRAE

At a special convocation held by the University of Saskatchewan on May 14, Dr. J. B. Ritchie of Regina, Saskatchewan, was honoured by the conferring of an honorary degree of Doctor of Laws. The citation follows:

". . . [Dr. Ritchie] was not always a surgeon. In 1910 he graduated from Manitoba University in Arts and for two years taught school in Saskatchewan. Then the persuasive arguments of Doctor Sahlmark, together with the prospect of playing on the Medical Faculty football team, induced him to take up Medicine, and in 1916 he graduated M.D. He then entered the armed forces as a Medical Officer till 1919, at which time he went into partnership with Doctor Hugh MacLean of Regina. So happy and admirable was this partnership that he has given a scholarship for the best student in surgery to graduate in 1957 and in all subsequent years, as a permanent testimony to Doctor MacLean.

"He has held numerous executive positions in the medical organizations of Regina, of the Province, and of the Dominion. In 1934 he was Chairman of the Regina Public School Board, in which capacity he was instru-

Canad. M. A. J.
Aug. 1, 1955, vol. 73

mental in the promotion of the inoculation of diphtheria toxoid in the Regina area, which has eliminated diphtheria from that area. He has been a staunch advocate of the establishment of the University Hospital.

Apart from his professional associations, he has been a patron of the arts, an ardent supporter of the Roughrider's football team, and a man active in the affairs of his community.

It is particularly appropriate that we honour John Boyle Ritchie at this time, as he is the immediate Past President of the College of Physicians and Surgeons of Saskatchewan in this year of the opening of this University Hospital and of the fiftieth anniversary of this Province and, therefore, by honouring him we honour the body corporate of the medical profession of Saskatchewan.

QUEBEC

Dr. C. D. Shortt, senior medical officer for the Canadian National Railways, has been elected president of the Industrial Medical Association of the Province of Quebec. He succeeds Dr. E. A. Turcot, regional physician of Imperial Oil. Vice-presidents elected were Dr. Hervé Gagnon of St. Hyacinthe, and Dr. Milton Townsend of Montreal.

Dr. E. L. Margetts of the Department of Psychiatry, McGill University, has gone to England, having received a Humanities Research Council of Canada grant for overseas medical historical research this summer. The research will consist of field and museum studies to further his project, "The archæology of the mind: psychological studies in prehistory."

The work will involve examination of portable art, prehistoric burials, monuments, and cave art, and will cover sites primarily in England, France and Spain. The object of these studies is to attempt an integration of psychology and sociology with prehistoric anthropological-archæological discoveries.

The Montreal Neurological Institute will receive a $10,100 federal grant to support the development of an epilepsy clinic. The new service will be concerned with the investigation and rehabilitation of persons of all ages who may be afflicted with epilepsy.

NEW BRUNSWICK

The Saint John City Board of Health celebrated its one hundredth anniversary this year. Dr. J. A. Melanson, New Brunswick Chief Medical Officer, gave the dinner address. Other doctors present were Dr. G. B. Peat, Mayor of Saint John, and Dr. Frank Hazen, District Medical Health Officer.

At the meeting of the N.B.–P.E.I. Branch of the Canadian Public Health Association held in Charlottetown in May, the Hon. J. F. McInerney, M.D., Minister of Health for New Brunswick, was presented with a key to the City. Dr. J. A. Melanson was chairman of the dinner meeting and Dr. A. M. Clarke took part in a panel discussion on prepayment plans for medical care.

At the annual meeting of the Maritime Hospital Association held in Charlottetown, the N.B. Department of Health was represented by Dr. A. M. Clarke and Dr. R. J. Dolan, Director of Hospital Services and Cancer Control.

Dr. Austin M. Clarke has been appointed Executive Director of the Moncton Hospital. He will assume his new duties on September 1. Dr. Clarke has been Assistant Chief Medical Officer and Director of Health Planning Services of the N.B. Department of Health since 1948, and has had many years of service in health services, particularly in the tuberculosis field.

Dr. Arthur F. Chaisson of the N.B. Department of Health attended the meeting of the Directors of Communicable Disease and V.D. Control of Canada, held in Ottawa, May 18-20.

Dr. Val Zed of Saint John has been appointed Chairman of the New Brunswick Rehabilitation Assessment Team.

Dr. Lionel Guravich of the Department of Medicine at the D.V.A. Hospital, Lancaster, N.B., has completed a course in clinical cardiology and electrocardiography at the Peter Bent Brigham Hospital, Boston, provided as a travelling fellowship by the American College of Physicians.

Dr. D. F. W. Porter has resigned his position of Director of the Moncton Hospital, the erection of which he supervised. It is reported that Dr. Porter will engage in hospital consulting work in the Maritimes, particularly in relation to the group of religious hospitals of Saint Joseph.

Dr. R. A. H. Mackeen, Director of the Provincial Laboratory of New Brunswick, is convalescing satisfactorily after a long illness which confined him to the Saint John General Hospital for more than two months.

Dr. W. L. Neustatter, Director of Psychiatry at the Maudsley Hospital, London, England, addressed a meeting of the doctors of the southern section of New Brunswick at the Provincial Hospital, Lancaster, on June 16; he discussed "The principles of psychiatry applicable to doctors in private practice." Dr. Neustatter was kind enough to stop off in New Brunswick on his way to the B.M.A.-C.M.A. meeting in Toronto.

A. S. KIRKLAND

NOVA SCOTIA

The Royal Canadian Navy's northern research vessel H.M.C.S. *Labrador* carried a crew of 240 and an equal number of "guinea pigs" when she sailed from Halifax in the latter part of May on the second long mission to the Arctic. Men and guinea pigs are one and the same. Doctors and physiologists among the 15 scientists aboard will keep crew members under quiet surveillance to see how they react to the strains of six months' continuous voyaging above the Arctic circle.

Dr. George H. Murphy, former Professor of Surgery, Dalhousie University, and first Minister of Health in the Nova Scotia Government twenty-five years ago, was among those honoured at a testimonial dinner to Robt. L. Stanfield, leader of the Nova Scotia Progressive-Conservative party.

Dr. Wallace Roy, Professor of Radiology, Dalhousie University, and Chief of Radiology at the Victoria General Hospital, has resigned his appointments effective June 1 to take over the post of Chief of Radiology at St. Joseph's Hospital, Toronto.

Dr. William Taylor, recently appointed Associate Professor of Pathology at Dalhousie University and Associate Provincial Pathologist, came to Halifax from Glasgow, Scotland, where he had been an Assistant Professor in Pathology at the University of Glasgow and Associate Pathologist with the British Ministry of Health.

Col. F. C. Pace of the National Civil Defence School staff at Arnprior, Ont., and widely known as Commanding Officer of the Civil Defence School at Camp Borden for the past four years, was guest speaker at the dinner

Canad. M. A. J.
Aug. 1, 1955, vol. 73

of the Defence Medical Association on June 9. Arrangements for this dinner were made by Dr. H. C. S. Elliott and Dr. J. E. H. Miller, the president and secretary respectively of the Defence Medical Association in Nova Scotia.

Miss Joan Hudson, the executive secretary of the Dalhousie medical postgraduate committee, was fortunate recently in winning an all-expense air trip to Florida for herself and her mother, the first prize in a commercial contest.

Dr. C. L. Gosse, Professor of Urology at Dalhousie University, was recently elected president of the Halifax Medical Society.

Guest speaker at the annual meeting was the Hon. Geoffrey Stevens, Minister of Health, who reviewed the work of his department in its relations with the medical profession of Nova Scotia.

The new executive includes Dr. A. L. Murphy, Vice-President; Dr. Jack Slayter, Secretary-Treasurer; and Dr. Ralph Ballem, Dr. N. B. Coward, Dr. R. M. MacDonald, Dr. Ian MacGregor, Dr. Alvin MacCrae and Dr. D. J. Tonning, executive members.

Dr. J. E. Stapleton, Chief of Radiation Therapy at the Victoria General Hospital, spoke recently before the annual meeting of the Women's Auxiliary of the Canadian Cancer Society, Halifax branch. Dr. Stapleton discussed the different types of radiation therapy and also stressed the lack of suitable accommodation for patients coming to Halifax for long-term cancer treatment.

C. M. HARLOW

ASSOCIATION NOTES

C.M.A. GOLF TOURNAMENT

On Friday afternoon, June 24, a C.M.A. Golf Tournament was held at the Scarboro Golf and Country Club, one of the best courses in the Toronto area and on several occasions the scene of the Canadian Open. Four trophies were played for and in addition a number of prizes were provided. The winners were:

Ontario Cup: G. B. Bigelow, Victoria, B.C. (best low net score of 70, also low gross of tournament, 73).

Hamilton Cup: W. B. McGuire, Simcoe, Ont. (low net score for Ontario, 71).

Alberta Cup: Ontario Team—L. W. Black, 83–10 = 73 net, H. M. Coleman, 86–13 = 73 net; W. C. Givens, 82–9 = 73 net; A. R. McGee, 82–9 = 73; total, 333–41 = 292.

London Cup: Toronto East Medical Association—J. T. Colthart, 106–33 = 73 net; J. H. Davies, 82–9 = 73 net; W. C. Everist, 88–14 = 74 net; and J. R. Fulton, 91–17 = 74 net; total, 367–73 = 294.

Most senior golfer (four score): J. Y. Ferguson, net 74.

Putting (tie—36): Walter Oakes, Clinton, Ont.; Lou Harnick, Toronto; C. D. Keeley, Chatham, Ont.

2nd best gross score: J. T. White, 78.

3rd best gross score: A. J. Longo and R. H. Penney, 79.

Best net score: Manitoba—G. L. Adamson, Winnipeg; Quebec—G. E. Wight, Montreal; Maritimes—W. T. Hooper, Charlottetown.

The handicapping was done according to the Calloway system.

BOOK REVIEWS

PRACTICAL MANAGEMENT OF DISORDERS OF THE LIVER, PANCREAS AND BILIARY TRACT

J. R. Twiss and E. Oppenheim, Associate Professors of Clinical Medicine, New York University Post-Graduate Medical School. 653 pp. Illust. $15.00. Lea & Febiger, Philadelphia; The Macmillan Company of Canada Limited, Toronto, 1955.

The combined Medical and Surgical Biliary Tract Clinic of the New York University Hospital has an immense turnover of cases and definite views on their management. The present book stems from the experience of the staff of this clinic, and is essentially a practical guide to the diagnosis and management of the commoner disorders of the liver, pancreas and biliary tract. Less common conditions are briefly dismissed; for example, amœbiasis and hydatid disease are dealt with in four pages. Stress is laid on the reciprocal effects of disorders of the liver, biliary apparatus and pancreas on each other, and the voice of personal experience is frequently heard. For example, discussion of the post cholecystectomy syndrome is based on a review of 126 cases studied by the authors. Nevertheless, due note is taken of results and opinions coming from other centres.

The authors adopt a properly critical approach to a controversial subject; they give a fair account, for instance, of the alleged value of lipotropic factors in therapy, and are sceptical of the role of alcohol in portal cirrhosis, and the value of cholecystectomy in migraine.

Material is well classified and arranged, and illustrations and references are adequate. Details of surgical treatment are omitted. Enough background in basic sciences is given to make material intelligible. This is a valuable book for the practising physician.

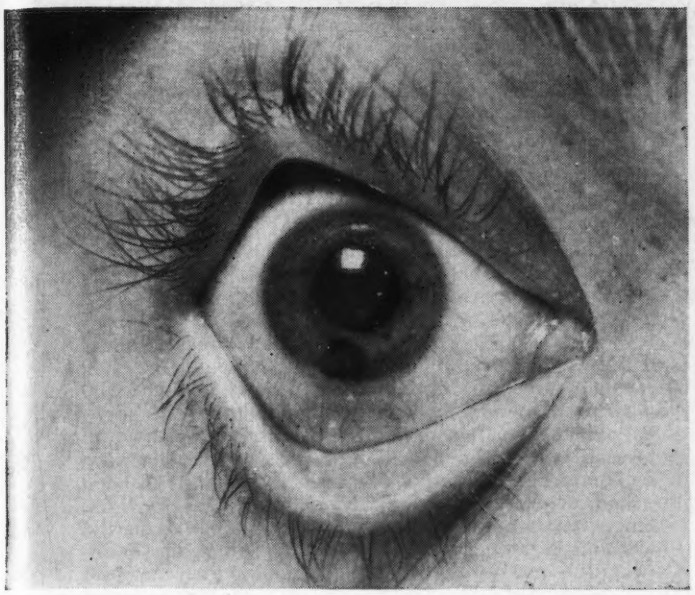
HYPEROSTOSIS CRANII

S. Moore, Professor Emeritus of Radiology, Washington University School of Medicine. 226 pp. Illust. $11.50. Charles C Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1955.

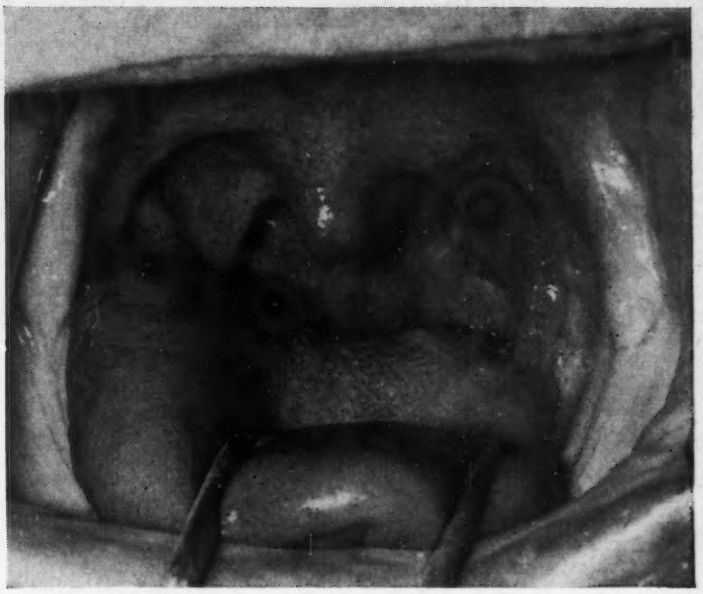
This book incorporates the data and conclusions resulting from a detailed study of the skull over a 25-year period. Dr. Moore's investigation covers x-ray films of 10,000 consecutive skull examinations on patients admitted to the Edward Mallinckrodt Institute of Radiology from June 15, 1935 to March 15, 1945. A control group of over 1,200 individuals free of hyperostosis, in addition to the study of hundreds of other radiographs and anatomical specimens, is included. A detailed study of roentgen dimensions of the hyperostotic skull both in living and museum material has been compiled and compared with the normal. The pathology of the condition is described.

Four types of hyperostosis of the vault of the skull are distinguished radiographically by location and bone texture. A large number of excellent reproductions of skull radiographs are incorporated in the book. The differential diagnosis of hyperostosis cranii, Paget's disease, acromegaly, congenital anomalies of the skull and other lesions of the vault resulting in derangement of calcification and thickness is presented.

The author emphasizes the part played by the pituitary, thyroid and gonads in the syndrome. A complete bibliography together with a chapter on paleopathology and items of historical interest are present. Radiologists, interns, and pathologists will be particularly interested in the book.



Tattoo, right cornea



Tumor of neck

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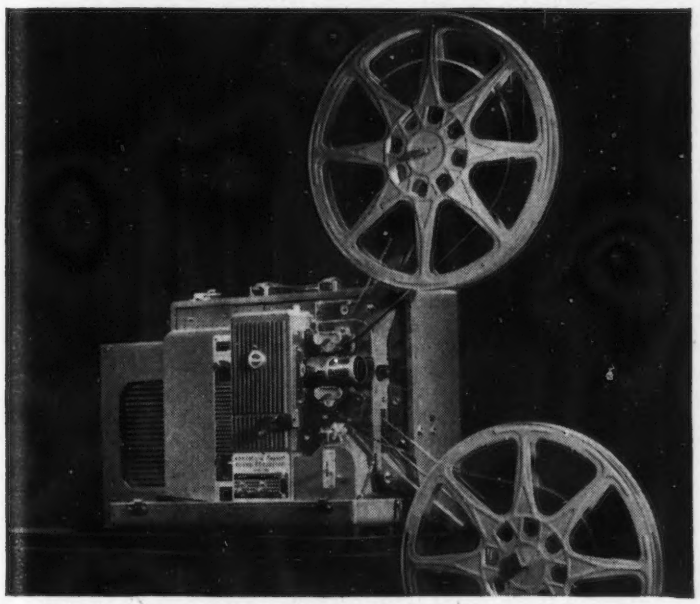

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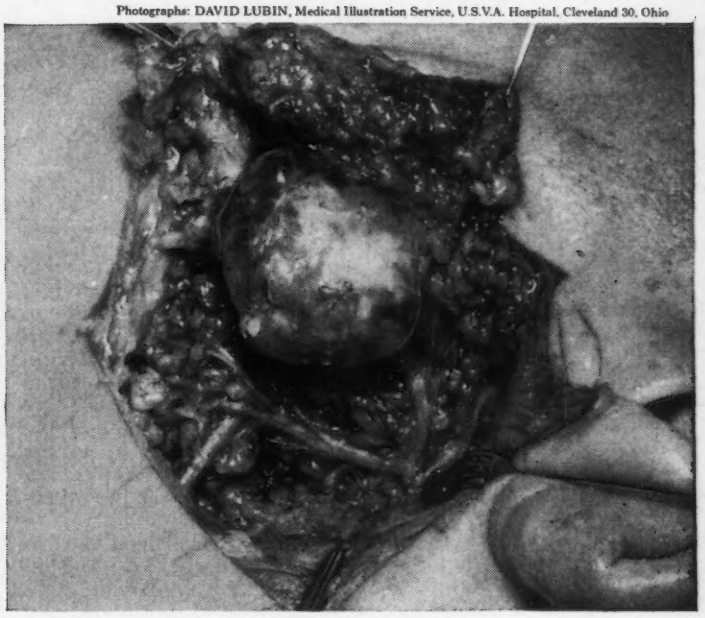

Left parotid tumor

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Canad. M. A. J.
Aug. 1, 1955, vol. 73

BIOCHEMICAL INVESTIGATIONS IN DIAGNOSIS AND TREATMENT

J. D. N. Nabarro, Assistant Physician, Middlesex Hospital. 299 pp. illust. 25/-. H. K. Lewis & Co., Ltd., London, W.C.1, 1954.

Biochemistry now pervades the whole of internal medicine and a good deal of surgery too. A result has been the production in recent years of a number of books attempting to interpret the subject to clinicians. The present book is written by a clinician for the guidance of interns and residents, and is intended to show them how biochemical investigation can help in diagnosis and the planning of treatment. It is in no sense a treatise on applied biochemistry or a laboratory book, since practical details of tests are not given.

Dr. Nabarro's work is somewhat uneven in its treatment of the subject. He gives us a fairly complete explanation of electrolyte metabolism and helpful discussions of such subjects as skeletal rarefaction and diabetes, but dismisses the vitamins very summarily indeed. Perhaps, however, he would justify this by claiming that most space has been allotted to subjects in which the clinician is likely to receive most help from routine biochemical studies. An unusual feature is a short section on common poisonings. The book should help the perplexed clinician who would like biochemical help in a case but does not quite know what to ask for.

OPERATIVE ORTHOPEDIC CLINICS

L. Cozen, Assistant Professor of Orthopedic Surgery, College of Medical Evangelists, Los Angeles, and A. Brockway, Chief of Staff, Orthopedic Hospital, Los Angeles, in collaboration with P. E. McMaster, Clinical Professor and Acting Head of Department of Orthopedic Surgery, University of California at Los Angeles Medical School. 329 pp. illust. $10.00. J. B. Lippincott Company, Philadelphia and Montreal, 1955.

This is a rather unusual book dealing with operating room experience in orthopædic conditions. The form of the book is unusual, since it lists dictated operation reports on a wide variety of conditions, with a postoperative discussion, as if one were listening to the surgeon talking after the performance of some procedure. There are many good line drawings illustrating many of the procedures. Very little information is given as to the indications for operation; it appears to be rather the intent to describe technical details, including postoperative care.

The procedures listed in the book have been used at the Wadsworth General Hospital and the Los Angeles Orthopedic Hospital. They are quite similar to those carried out on any busy orthopædic service. Bibliography at the end of each chapter is extensive and excellent.

This should be a very useful book, particularly to those who are training in surgery and young practising orthopædic surgeons.

CLINICAL DIAGNOSIS

E. G. Wakefield, Diplomat of the American Board of Internal Medicine; Consulting Physician, Section of Medicine, Mayo Clinic. 1,611 pp. illust. $22.50. Appleton-Century-Crofts, Inc., New York City, 1955.

The clientele of the Mayo Clinic differs somewhat from that of most large medical centres. At the Clinic all are accepted as private patients, many have ailments of long standing and the maiority are transients, some of whom have come a long distance. Although emergencies are relatively infrequent, there is nevertheless a constant compulsion to carry out diagnosis and therapy with reasonable dispatch so that the patient may be kept from avoidable physical and financial hardship. The emphasis is always on the practical and not on the theoretical or speculative.

The atmosphere of the Clinic is discernible throughout this book, which is the first attempt on a large scale to set forth the diagnostic methods adopted or initiated by the Clinic through the years. Like most books on diagnosis it is primarily a reference work. Much care and thought have evidently been given to the arrangement so that information is usually found where it would logically be expected. Although not numerous, figures and illustrations are clear and simple. The writing is straightforward and lucid on the whole, even if it is possible, as in any text of 1,550 pages, for a meticulous critic to find wordiness, repetitions and explanations of the obvious. In an over-all appraisal a reviewer will not be grossly over-generous if he commends the author for a successful effort to keep the reader from fatigue or boredom.

Since the general tone of the book is based on the views and experiences of a particular group of practitioners, the market may not at first be wide. For past and present physicians of the Mayo Clinic the appeal will naturally be immediate for sentimental as well as for utilitarian reasons. To the practitioner who has not been indoctrinated in the principles of patient management which prevail at the Clinic a liking for the book may come only with repeated use. Undergraduate acceptance will possibly be influenced by the argument that emergencies and acute disabilities are dealt with more authoritatively in works originating in more populous centres. As time goes on, however, Wakefield's *Clinical Diagnosis* will in all likelihood attain a prominent position among the medical authorities, and may be consulted with confidence.

GOODBYE HARLEY STREET

R. Scott Stevenson. 224 pp. illust. $3.25. Christopher Johnson, London, England; The Ryerson Press, Toronto, 1954.

Not many successful professional men still understand how to enjoy their lives to the full. When one of this diminishing band writes his reminiscences and conveys his joie de vivre to his tense and obsessional colleagues, the therapeutic effect should be considerable. Duff Cooper in his autobiography "Old Men Forget" put this attitude to life across to his readers, and showed that devotion to duty is not incompatible with enjoyment of life. Dr. Scott Stevenson, a distinguished otologist and a very good friend to the deaf in the United Kingdom, conveys in his present volume of reminiscences the same lesson of hard work and hard play. His connections with medical journalism account for the ease with which he sets down a great deal of interesting information on a variety of topics.

Canadian readers will be particularly interested in his critical and well-reasoned comments on the National Health Service, and in the chapter in which he describes the high-handed suppression of his own hospital in London by the powers that be. In the latter chapter, the remark of a leading member of the committee to the medical staff, "I am accustomed to doctors who do what I tell them," has an ominous ring. Speaking of the doctors and the State, he says, "They must seek the support of other professions in the struggle against the cannibalism of the State, for the fight is not only up to the doctors, dentists and medical auxiliaries, but to all professional men and women, lawyers, teachers, engineers, accountants, architects, even artists."

Dr. Stevenson has two very interesting chapters on overcoming deafness and on the deaf child; these merit study by general practitioner and specialist alike. There is also much lighter material—comments on Paris and Chicago, and a delightful description of an evening in Harlem in speakeasy days, spent under the tutelage of a taxi driver. This is recommended reading for the week-end.

Canad. M. A. J.
Aug. 1, 1955, vol. 73

HYPOTHYROIDISM

An Essay on Modern Medicine. P. Starr, Professor of Medicine, Chairman of the Department of Medicine, University of Southern California, School of Medicine, Los Angeles, California. 127 pp. $4.00. Charles C Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1954.

The author in this monograph tries to make a case for the diagnosis of subclinical hypothyroidism which he believes to be rather prevalent and in which the previously accepted diagnostic criteria of myxœdema may occur not at all, or only in part.

He postulates the homœostatic mechanism for the maintenance of thyroid function to be the need of the tissue for thyroxine, transmitted in some way as yet unproven to the hypothalamus, which in turn activates the anterior pituitary to produce TSH, which stimulates the thyroid to produce thyroxine. Breakdown of any portion of this sequence of events may give rise to hypothyroidism, in greater or lesser degree, and he takes issue with Means's generally accepted concept that a person either does or does not have myxœdema and that halfway types of hypothyroidism exist rarely or not at all.

In the author's opinion, the level of the protein bound iodine in serum is the most accurate diagnostic test of hypothyroidism, whatever its cause, and he goes into great detail in describing various methods of estimating this. He shows in many instances the lack of correlation between the P.B.I. and basal metabolic rate, and does not consider the latter to be diagnostic of thyroid function. Clinical examples of the various etiological types of hypothyroidism are discussed, along with their response to treatment.

This book is interesting in its theories and represents a great deal of careful thought and observations on the part of the author and his associates. It will be welcomed for this reason by those who feel that subclinical hypothyroidism really does exist and is a factor in loss of well-being, if not in actual illness. However, it fails to be convincing in its supportive arguments, clinical evidence and laboratory findings. It is also much too detailed in its description of chemical and biochemical diagnostic procedures to become a book of general interest.

MANUAL OF HAND INJURIES

H. M. Nichols, Clinical Instructor in Surgery, University of Oregon Medical School, Portland. 351 pp. Illust. $9.50. The Year Book Publishers, Inc., Chicago, Illinois; Burns & MacEachern, Toronto, 1955.

The title of this excellent manual is somewhat misleading, since chapters on infection, on elective reconstruction procedures and on secondary tendon repairs are included. Minor injuries, burns, fractures, soft tissue replacement and amputations are described at length. Illustrations are many and clear.

One wonders whether many clinics are still treating acute tenosynovitis by wide incision and packing, as described here. It should be pointed out also that credit for the tube pedicle illustrated on page 339 is incorrectly assigned.

On the whole this is a very practical volume and its use will well repay study both by the surgeon who occasionally repairs an injured hand and the surgeon whose main interest is in the hand.

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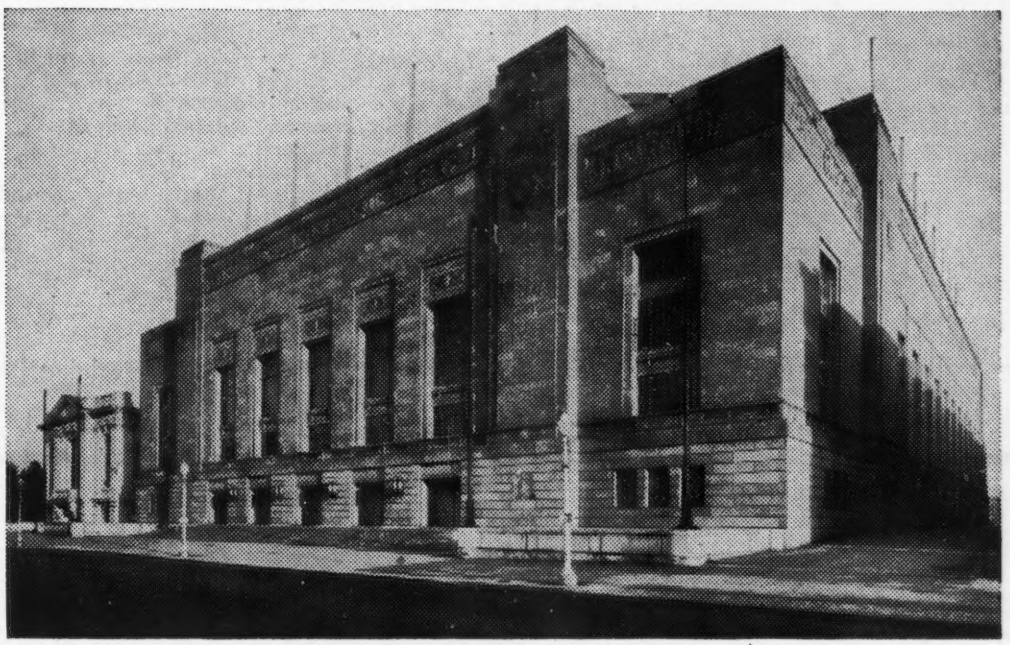

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Canad. M. A. J.
Aug. 1, 1955, vol. 73

BLOOD COAGULATION AND THROMBOSIS

The British Medical Bulletin, Vol. II, Number 1. 82 pp. Illust. $2.75. The Medical Department, The British Council, London W.1, England; Oxford University Press, Toronto, 1955.

This number of the British Medical Bulletin consists of a symposium on blood coagulation and thrombosis. There are thirteen papers, with a concise and interesting introduction by R. G. Macfarlane. Among the subjects covered are hæmophilia, circulating anticoagulants, platelets and platelet agglutins, the mode of action of coumarin drugs, the chemistry of coumarin anticoagulants, and the chemistry and action of heparin.

All the authors are thoroughly familiar with their particular fields, and each article has an excellent bibliography. This symposium should be in the possession of everyone interested in the subject.

HERNIA

The Pathologic Anatomy of the More Common Hernias and Their Anatomic Repair. C. B. McVay, Clinical Professor of Surgery and Associate Professor of Anatomy, The University of South Dakota School of Medical Sciences. 40 pp. illust. $5.25. Charles C Thomas, Springfield, Illinois; The Ryerson Press, Toronto, 1954.

This is an atlas portraying the normal and abnormal anatomy involved in the treatment of the more common hernias. Diaphragmatic, epigastric, umbilical, inguinal, femoral, incisional, lumbar and pelvic hernias are described in detail with the aid of clear, accurate black-and-white illustrations. The descriptions of the hernias and the excellent illustrations of their repair are lucid and brief.

In his description of each hernia repair, the author emphasizes the principle of restoring abnormal to normal anatomical architecture. The author, as he has done in several previous publications on this subject, urges recognition of the anatomical significance of the pectineal (Cooper's) ligament and its relationship to the transversalis fascia—so important in the surgical treatment of inguinal and femoral hernias.

This atlas is highly recommended for medical students, surgical residents and surgeons.

PREREQUISITES OF GOOD TEACHING AND OTHER ESSAYS

E. Sachs, Research Associate, Surgery and Medical History, Yale University. 118 pp. $2.50. The Shoe String Press, Hamden, Conn., 1954.

Dr. Ernest Sachs has been teaching medical students at Washington University for 35 years, and has obviously enjoyed the experience greatly. In the present little book of essays he gives advice to the student or young doctor on a number of aspects of medical practice often left undiscussed by teachers. The advice is sensible and humane, and the book should prove helpful to those worried about such problems as obtaining permission for autopsy, breaking bad news to a family, and handling a case in which a professional colleague has missed the diagnosis.

SYMPOSIUM ON MEDICAL PRACTICE

On Thursday, September 22, at the Royal York Hotel in Toronto, the Ontario Chapter, College of General Practice of Canada, together with Lederle Laboratories, are sponsoring a symposium on current concepts in medicine. During the one day session there will be lectures by authoritative speakers from various parts of Canada and the United States, with panel discussions at the end of the morning and afternoon periods. The following speakers have accepted invitations to appear:

DR. R. F. FARQUHARSON	Toronto	(Medicine)
DR. KENNETH T. MacFARLANE	Montreal	(Obstetrics)
DR. ERIC M. NANSON	Saskatoon	(Surgery)
DR. HARRY R. NEWMAN	New Haven, Connecticut	(Urology)
DR. LOUIS A. BUIE	Rochester, Minnesota	(Proctology)
DR. WESTON M. KELSEY	Winston-Salem, N. Carolina	(Pediatrics)

All physicians are invited to this scientific meeting, for which there will be no fee. At noon physicians and their wives will be guests at luncheon. During the afternoon social activities will be arranged for the ladies, and at 5.30 p.m. there will be a reception for speakers, special guests, physicians and their wives.

In August, programmes will be mailed throughout Ontario, but in case the mailing list should be imperfect or incomplete, it is stressed that all physicians who are interested will be most welcome to attend and bring their wives.